Newly discovered portrait of the editor: 1969

EDITORIAL

THE EDITORIAL is just the place for introspective rambling if the editor lets his self discipline drop. It is also a place of privilege, where a chap may grasp a rare opportunity to express his views, just so long as they give passing reference to some items in the magazine. In past editorials I've found contentious stuff to dig my teeth into, but this year I feel satisfied I've already had my say on a topic that animates me a great deal, in one of the articles. In consequence I have nothing of world-shattering pteridological importance to impart and that feels like a lack of inspiration, which I assure you, is patently untrue at present. I will, therefore, limit myself to announcing important changes in the editorial team and add some commentary about the contents of this issue.

This editor is beginning to lose his grip. Drafts of the 2007 issue, corrected and returned by authors and preaf rooders, show that they were full of howlers that I hadn't noticed during the editing process. As editor, *I'm* expected to root out and correct them, but eye and mind are getting jaded or just plain lazy. After my 208 pages it is time for a new editorial team to take over. Martin Rickard will be editor and Alec Greening the designer. Martin is, of course, not new to *Pteridologist*, having been its founding editor in 1984, upgrading what had been Jimmy Dyce's newsletter. I hope you will deluge them with excellent material to fill the next six issues. Please begin right away. Virtually everything I've received is in here, used up, so I have nothing to hand on as a starter pack for them to launch the 2008 edition.

To discuss your ideas with Martin Rickard:
☎ 01885 410729; 💻 pteridologist@ebps.org.uk

I caught the ferns bug from Edward Step's *Wayside & Woodland Ferns* over forty years ago (crikey) and was subsequently drawn into the BPS by our 'new' editor (*right*) who was already established at the lab where I took my first job. My portrait above was taken in those times by a fellow student at Cambridge Tech. on a field course in Devon. *Plus ça change*: I've got hold of a male fern. I expect that then I thought I knew which it was. Today I would not be so reckless (page 172).

Fernery restoration and creation seems to be all the rage and, remarkably, this issue includes news of three previously unknown to us (page 184). Meanwhile others, such as Brodsworth (Eric Baker's collection) and Ascog Hall continue to 'bed in', thrive and attract visitors, to the certain benefit of the BPS.

Tree Ferns continue to fascinate horticultural pteridologists, so we have a rich contribution about them in the form of Tree-Fern Newsletter #13 (page 178). Special thanks to Alastair Wardlaw (ed.), not only for supplying plenty of copy very year, but also for sending the newsletter ready formatted.

Martin probably has the best library of fern books these days, but I wonder if he has *Flora Græca*? It's rather rare with not a lot on ferns, but the pictures of the ferns that are there are fabulous (page 203). For my money the best is the original drawing for *Cosentinia vellea* which is even more beautiful than the printed version and executed by the artist with prodigious precision, down to each individual soft hair. As we go to press I have my fingers tightly crossed, hoping that these illustrations reproduce faithfully for your pleasure.

Even more than usual I feel there is something here for every sort of pteridologist and I thank the authors (also those who enabled me to create volumes 1-5), my sub-editors Adrian Dyer and Yvonne Golding and sundry proof readers (Alison Paul in particular) for all their hard work and support. Please treat the new editorial team even better than you did me. I don't intend to be editor of *Pteridologist* ever again, but just in case (it's happened before to two of them), *au revoir*. ***James***

authors, please read

ADVICE FOR AUTHORS

Pteridologist welcomes contributions written in English on all aspects of the natural history and horticulture of ferns and related plants, indeed, anything fern-wise that will be enjoyed by a wide range of readers. Please refer to past editions for ideas regarding scope and presentation.

SCRIPT: Ideally text should be provided in the form of a WORD, RTF or TEXT file on a floppy disc, CD-ROM (PC or MAC) or e-mailed. I can scan typescripts and, if I must, even type spidery manuscripts. However, surely it is not the editor's job to sort out basic use of English? Authors are expected to use reasonably correct **splelngg**, **Grammer** and **punc;tua.tion**, and write in such a way that the **meaning** of the words is conveyed.

ONE SPACE between sentences and also one space between words, please.

CONVENTIONS: Scientific names should be in italics thus: *Polystichum setiferum*, (if typed or in manuscript, underlined). Variety names should be in normal type, capitalised and enclosed in single inverted commas thus: *Polystichum setiferum* 'Plumoso-divisilobum'. Common names should be in lower case thus: soft shield fern.

ILLUSTRATIONS: As JPEG etc., but I have scanners so please send line art, good photo prints (accompanied by their negatives) or 35 mm slides which I will return. If supplying silhouettes ensure they are not of squashed and shrivelled fronds, but actually look like the fern they came from, and are of decent quality. Send files larger than ~500Kb on floppy disc or CD-ROM please, not by e-mail. **Copy Deadline? NOW.**

PLEASE: check your contribution thoroughly for errors and ensure you have adhered to these simple procedures before you send it.

PTERIDOLOGIST 2007

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COVER PICTURE:
The ancestor common to all British male ferns, the mountain male fern *Dryopteris oreades*, growing on a ledge high on the south wall of Bealach na Ba (the pass of the cattle) between Kishorn and Applecross in the Scottish Highlands - *page 172.*

PHOTO: JAMES MERRYWEATHER

Unless stated otherwise, photographs were supplied by the authors of the articles in which they appear.

DISCLAIMER:
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Common adder's tongue
Ophioglossum vulgatum
North Yorkshire Moors

PHOTO: YVONNE GOLDING

NEWS & COMMENT

Dr TREVOR WALKER

an appreciation

by CHRIS PAGE

I feel fortunate to be able to assemble the following thoughts about a much respected pteridologist and cytotaxonomist from reminiscences of a largely personal standpoint. Trevor George Walker was known by most who knew him simply as 'TGW'. From having known TGW initially as a lecturer, I consider myself fortunate to have also then known him additionally as my undergraduate Tutor, then my PhD supervisor, then my post-Doctoral 'anchor-man' back in the UK while I worked abroad in the tropics, and spanning all of these and continuing for nearly 50 years onward, my guiding mentor and lasting friend. For he earned from his students that rare combination of both affection and unerring respect that can surround someone with such a strong presence. For I was both fortunate and surprised, at the beginning of the sixties, to have become a student of Trevor Walker, by a somewhat informal process of 'acquiring' each other through the accident of a common interest in ferns, rather than through any planned strategy in this direction. 'Fortunate', because meeting him set the scientific directions for the rest of my life. 'Surprised' because up to that moment, I had not realised that there was anyone else on this planet who was interested in ferns! For although my own interests at the time were very much at the sporeling stage, to have had the good fortune to come, so early on, under the gentle but impressive shadow of the guiding frond of a well established guardian who was sympathetic to my inherent interests and the pursuit of these, was an academic fatherly influence at least on my life that I have never regretted. The ability to have remained close allies ever since, has been largely, I think, through sharing a vision even of pteridology from essentially the same habitat niche, into which, after my years at Newcastle, I found I had become lastingly rooted.

Although fern cytology is the central contribution to pteridology for which we all know TGW, his interests spanned many aspects of evolution. It was his great diversity of thought, built around well-founded techniques and approaches that made research life with him so constantly absorbing. One main principle has particularly remained with me: the importance of beginning studies of plants as whole living things, both in the field and in the more captive environment of the glasshouse, where so many aspects of their complex life-cycles can be put to closer scrutiny and subtle environmental experimentation. Only then, once you have understood and recognised all stages of their life cycle, are you fit to even begin to take their studies further. I thus learned very much through our regular pilgrimages to the glasshouses, ferreting through frames full of a billion young sporophytes and somehow managing to make mental notes together on how each species' growth had developed since the last examination. We were not in the business (to my eternal relief) of making a myriad of measurements of everything - we could not have dealt with so much material if we had - and there was thus nothing to which we consequently needed to apply endless statistics (further relief). Ten minutes spent with one's head in a glass case full of an exceptional array of young tropical ferns at all stages of growth, provided adequate intellectual challenges of its very own kind!

The collections that we studied were partly ones originating from the early Manton-Sledge expeditions to Ceylon, to which were being extensively added those made by Trevor along with Molly Walker (née Shivas, of *Polypodium* fame) and often especially Clive Jermy, so the whole aura of tropical fern collecting in those days had the full atmosphere of a family firm. I was flattered to be adopted into that family. The ferns we studied

Fern Horticulture Conference, Kew (London), 1991

Left to right: Matt Busby, Harry Roskam, Barry Thomas, Martin Rickard, Trevor Walker, Peter Barnes, Josephine Camus and Alison Paul.

originated from diverse parts of the tropics, including Jamaica and then Trinidad, and later from across the southeast Asia-Australasia region (from Indonesia to New Guinea and New Britain), to which those of my own modest collections from the Indian Ocean islands and those of tropical Australia and, in due course, many separate Pacific islands, also came to be added. What we grew, and was minded daily by our faithful horticultural staff, soon filled two enormous greenhouses. For at that time (through the 1960's), Newcastle and Leeds were the unrivalled 'Meccas' for studies on living ferns, probably anywhere in the world. For both resulted from the original stimulation of Irene Manton, who herself had been tutor to both Trevor and Molly Walker. At Leeds, Manton herself, and then Stanley Walker and John Lovis and their students were working actively on mostly temperate fern genera. At Newcastle, the fern flavour was especially a tropical one, and here TGW led me on weekly 'walk-rounds' to which I always looked forward (conducted rather like ward-rounds at a hospital, and with similar assiduity of attention to each individual). I think TGW not only knew every individual plant, but also its particular foibles, for he could often point out details of significance which adapted each to specific niches in the environment from which it came, and the information which I absorbed left indelible impressions on me.

The relevance of these myriad observations and simple experiments, to understanding the subtleties of the autecological adaptations of ferns and fern allies in the field, and through this gaining new pieces of evidence about adaptive aspects of evolution, was infectious. To one who in my case had begun also with geological interests, all this living material excited many evolutionary ideas. I learned from my mentor especially about the complexities of fern ecology, both temperate and tropical (for we looked at everything pteridological that either of us could persuade to grow). Our cultivation work and observations on what we grew were, without a doubt, teamwork that needed multiple sets of eyes. I was always impressed in finding that looking at our numerous cultures of developing young ferns in a myriad of forms, gave exactly that same sensation of excitement as I had earlier so-often experienced with finding fossils: that we were seeing detailed aspects of organisms through critical stages of life cycles, and in so-doing, we were often seeing what the eye of man had never seen before. I regarded this as a privilege. I think this was also the fire that drove TGW. I came very much to appreciate his philosophy that, in trying to deal first with whole plant communities, rather than the biology of individual plants, it was a pity that ecologists had started at the wrong end!

Meanwhile, back at the laboratory, the developing understanding of the fundamental role which the processes of natural hybridisation and allopolyploidy had played in the evolution of pteridophytes, the elucidation of which had been pioneered at Leeds, and which I learned from TGW, were becoming, for me, absorbing. I thus learned first-hand, and was fascinated by, the experimental hybridisation techniques and subsequent cytological analytical methods which were throwing much practical new light on old taxonomic problems in ferns, and at the same time revealing, in still unsurpassed manners, the complexity of the evolutionary processes involved. TGW was clearly an expert in the use of Manton's techniques, in which I regard him as unequalled, not only through his powers of observation and deductive reasoning, but also through those less tangible assets in which he abounded: of quiet persistence and an inexhaustible supply of unhurried gentlemanly patience.

I learned too, by example, of the desirability of doing everything practical for oneself, from sowing spores to the photographic darkroom. How else do you find what will or will not cross with what or when anything is at its optimal meiotic stage for analysis? These were also the very early days of the Scanning Electron Microscope, and about this time, Chris Wood also joined us, and while he came up with magnificent SEM photos of Thelypterid fern spores, I came up with cuticular ones of *Equisetum*, both with enthusiasm additionally stimulated by regular contact with Clive Jermy. Together, we all saw tremendous future interpretive potentials in each of these additional approaches. With TGW, I learned too about the important role which photography can play (in which he was a real expert) and of how to be critical about, and to always improve, your own photographs and techniques. Under respective microscopes, it became an exciting turn of irony that the ploidy spectrum of the insular ferns from the Canary Islands, on which I was also working, was turning out to be dramatically different from that of the equally insular Jamaican ferns that Trevor was completing. Through his easy-going manner and ready approachableness, there was a constant flow of ideas at appropriate junctures, built on much first-hand experience. I absorbed these like a regularly watered fern culture, and was nurtured by them.

After further memorable years collecting and studying ferns in many parts of the tropics myself, the RBG Edinburgh became the fortunate inheritor of many of TGW's living ferns and microscope slides from Newcastle, which are now deposited there. These are now in the hands of Mary Gibby, who, like me, I am pleased to say, is a second generation Manton student. These living tropical ferns, assembled throughout Trevor's career, will, for me, remain indelible parts of his epitaph, for they have now long helped to educate new generations of taxonomists, amongst whom may continue to emerge a future pteridologist or two with that essential appreciation, which Trevor had, of plants as living organisms, from the receptive ranks of those who today are themselves yet mere 'sporelings'.

A CHILLI FERN?

Graham Ackers

In our household we love chillis! We attend chilli fairs, grow chillis, and cook with them. They are of course pungent fruits, and kitchen preparation can have unwanted side effects for the unwary. I am sure some of you will have chopped chillis, washed your hands, then half an hour later unthinkingly rubbed your eyes (or other parts which is worse). The resulting sting is unpleasant and annoying (because by then you will have forgotten you had been chopping chillis!). Stupidly I have done this several times. It seems to take many hand scrubbings to remove this particular pungency.

What has this to do with ferns? Well, whilst on holiday in the Cape Verde Islands in February, I came across a fern that I had not seen before, so I took a frond for inspection at our accommodation. It turned out to be *Hypodematium crenatum* (Fig. 1).

Fig. 1. *Hypodematium crenatum in the cape verde islands*

Fine, but then a short time later I rubbed my eyes, and guess what? Yes, it felt as if I had been handling chillis! The fern superficially feels pleasantly hairy, but under later high powered magnification, sharp needle-like hairs could be seen. So, is the chilli-effect of this fern mechanical (caused by the hairs) or chemical? And have other members had similar experiences with this or other ferns?

Fig. 2. *Adiantum incisum*

Incidentally, Cape Verde is very dry and consequently not too good for ferns.

We spotted only 9 species, the others being *Adiantum incisum* (Fig. 2), *A. capillus-veneris*, *Asplenium hemionitis*, *Christella dentata*, *Cosentinia vellea*, *Davallia canariensis*, *Notholaena marantae*, and *Pteris vittata*.

Please e-mail me with any thoughts at:
GrahamAckers@compuserve.com

THE BOTANICAL RESEARCH FUND

The Botanical Research Fund is a small trust fund which makes modest grants to individuals to support botanical investigations of all types and, more generally, to assist their advancement in the botanical field.

Grants are available to amateurs, professionals and students of British and Irish nationality. Where appropriate, grants may be awarded to applicants in successive years to a maximum of three.

Examples of projects recently supported by the Botanical Research Fund include:

* Development of a vegetative key to the British Flora
* Herbarium research for a monograph of *Strobilanthes* (Acanthaceae)
* Taxonomic studies of the Coralline algae
* Field surveys of seaweeds, bryophytes and *Rubus*
* Laboratory work to investigate the status of *Gladiolus illyricus* in the UK.

The next deadline for applications is January 31st, 2008.

Further details may be obtained from Mark Carine, Hon. Secretary, The Botanical Research Fund, c/o Department of Botany, The Natural History Museum, Cromwell Road, London, SW7 5BD. Email: m.carine@nhm.ac.uk

NEWS & COMMENT

WOULD YOU BELIEVE . . . ?

Alder cone smoked grouse with liquorice fern root glaze and salal berry sauce

The chef advises: "Licorice Fern [*Polypodium glycyrrhiza*]: I have no idea what its geographic range is or what flavor its root would impart. Based on its name I am going to try diced Fennel bulb, Fennel seed or a wee bit of Star Anise stewed in Port instead."

YumYum.com

The recipe website for everyday cooks!

http://search.yumyum.com/recipe.htm?ID=20283

Labouré - Roi
Montagny Premiere Cru

£15.95/75cl, 75cl **£15.95**

- Laboiré Roi has a bouquet of hazelnuts & ferns with a lingering of fruit
- Serve chilled with shellfish, white meat or creamy cheeses or aged for up to 2 years from vintage
- Selected for John Lewis in association with the Waitrose team of Masters of Wine

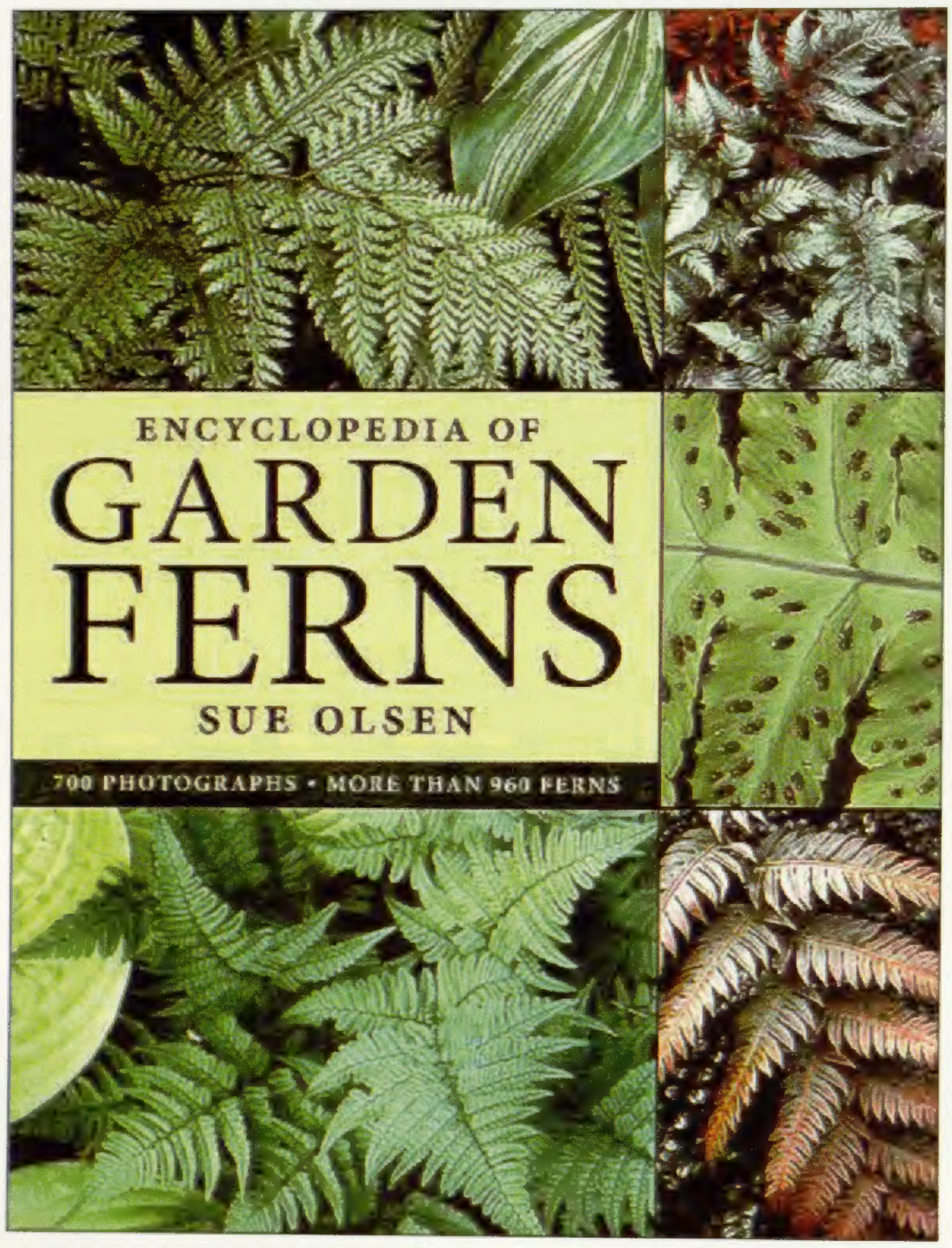
29-09-03 784 26501

. . . AND

What on earth does a "bouquet of ... ferns"? mean and what would it smell like? Could a pteridologist recognise it, let alone your average wine drinker? The fact that someone thought it was a selling feature is an interesting reflection of the recent rise in the popularity of ferns. *Adrian Dyer*

MALE FERN CURIOSITY - NO MERE VARIETY

In woodland, not far from Plockton in the Western Highlands, I came across a small group of *Dryopteris affinis* one of which had a single pinna (just one) that was broader than all others, with long pinnules that were markedly serrated. I expect it was a somatic (non-reproductive) mutation or the accidental, localised expression of a gene or genes not normally used by the plant. One might have expected this odd pinna to express an alternative pattern belonging to the natural range of morphology in *D. affinis*, but it does not, nor does it resemble the pinna of any other of our male ferns. *James Merryweather*



Sue Olsen

ENCYCLOPEDIA OF GARDEN FERNS

Timber Press, 2007
£40 (BPS Booksales: £28)

Reviewed by
Graham Ackers

This impressively large quarto format book has 444 pages, covers 960+ fern taxa, includes 700 photographs, and weighs about 2 kilos!

Following the usual preliminaries, we are treated to 10 pages of lovely photographic portraits showing ferns through the seasons. This exercise in indulgent iconography is beautifully presented and suggests a "coffee table" book, but unlike many of that genre, this work is also packed with masses of solid information, as we shall see.

The first chapter "Ferns Through the Ages" presents an assortment of historical perspectives – palaeontological, artistic, discovery of fern reproduction, Wardian cases and the Victorian fern craze. Then follows "Cultivating Ferns" - in woodland gardens, containers, on mounts, in rock gardens, on walls, xerophytes, stumperies, bogs, tree ferns, and indoor ferns. The third chapter, "Propagating Ferns", covers vegetative propagation (bulbils, division), growing from spores, and (briefly) tissue culture. Chapter 4 is "Fern Structure and Basic Diagnostics". Fern structure, which is covered fairly briefly, includes helpful simple illustrations by Richie Steffen of the Miller Botanical Garden in Seattle. For diagnostics, the author has adopted a somewhat novel approach to help non fern specialists recognise to which major fern genus a specimen belongs. I wonder if she has tested this on some fern beginners. The bulk of the book is contained in chapter 5, "Ferns from Around the World", spanning pages 81 to 401, and covering 86 genera. Within the genera, significant species are covered first, giving name (scientific, common, and derivation), size, description, geographical range, taxonomic history, economic importance, historical herbal use, general growing conditions (including the suitable hardiness zones), and propagation characteristics. Briefer species treatments follow under the "Shorter Notes" sections. The author for the tropical ferns is George Schenk, described by Sue Olsen as a "long-time friend".

Appendix 1 is the familiar USDA Plant Hardiness Zone Map (unfortunately with an unreadable key). Appendix 2 is the European equivalent. Appendix 3 comprises two lists of Award-Winning Ferns – the RHS Award of Garden Merit taxa, and recommendations from the Miller Botanical Garden, Seattle for outstanding ferns appropriate for the Pacific Northwest. Appendix 4, "Favorite Ferns for Sites Around the World", is particularly interesting because it covers responses from Hardy Fern Foundation trial gardens throughout the USA, as well as two from the UK (Alan Ogden and Martin Rickard), and one from Australia (Keith Rogers). The lists are sequenced from gardens in zones 4/5 up to zone 11. The following appendices are "Ferns for Special Situations (5), "Fern Societies" (6), "Where to See Ferns" (7), and "Where to Buy Ferns" (8). The work is concluded with a Glossary, References, and an Index of Plant Names.

The author of the book, Sue Olsen, is known to me and quite a few other BPS members as a result of our mutual attendance on international fern excursions. Based in Seattle, Washington, she has been studying and growing ferns for about 40 years, and started her fern nursery "Foliage Gardens" in 1967. [www.foliagegardens.com] She founded the Hardy Fern Foundation in 1989 "to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community" – in other words an on-going research project to test the hardiness of ferns in different situations (I cannot think of a more worthwhile initiative to increase our knowledge of fern horticulture). Having seen Sue "in action" in recent years, she displays an insatiable appetite for increasing her fern knowledge, continually observing, questioning, photographing and note taking when anywhere near a collection of ferns. This book then is a comprehensive outcome from all this accumulated knowledge, and it shines through every page.

BOOK REVIEWS

Despite the book's title, the species coverage is way beyond what most gardeners in temperate climates could aspire to cultivating. Indeed, the book includes a significant number of species cultivated in tropical regions (which is fair enough), several "difficult" species groups (again reasonable), and some genera that most sane folk would never let near their gardens. For example, a full account is given of the morphology, ecology, chemistry, uses, and weediness (and control) of bracken (p. 359) in its various forms within which is included the caveat that "uncontrolled bracken is not an ornamental addition to gardens". A similar treatment is applied to equisetums (p. 251), with descriptions of 10 species, where incidentally the author considers *Equisetum telmateia* to be similar to *E. arvense* – as an equisetum novice, the one species I can recognise instantly with its impressive stature and distinctive ivory-white main stem internodes is *E. telmateia*. Continuing with some more ad hoc observations, I would disagree with the implied similarity of *Matteuccia orientalis* to *M. struthiopteris* (p. 271) – with me they are quite different plants both physically and horticulturally. I am unsure as to why the name *Dryopteris submontana* has been downgraded to a synonym of *D. mindshelkensis* (p. 236). On page 172, four good European species of *Cheilanthes* (*C. maderensis*, *C. guanchica*, *C. acrostica*, *and C. tinaei*) seem to have been subsumed under the name *C. pteridioides*.

On page 84, very useful diagnostics are given to separate the very similar *Adiantum aleuticum* from *A. pedatum*. Indeed, the species diagnostics in general are much more comprehensive than one would normally associate with a horticulturally based book, and the species coverage exceeds that of any other book on fern horticulture. It is remarkable to consider that the two largest genera, *Dryopteris* and *Polystichum*, are covered by 86 and 82 species and hybrids respectively - and those figures exclude cultivars!

Typically, books of this kind are used principally for reference and not cover to cover reading. Do not however dismiss the latter idea out of hand, as the narrative style is fluent, articulate and entertaining, as I hope some examples will show. In discussing *Cheilanthes* (p. 163) – "It is not necessary to be a geologist or chemist to cultivate these ferns, although it may help". (This brought on a chuckle – I am a serial killer of *Cheilanthes*, and I perceived that Sue Olsen was not entirely comfortable with them either!). In describing *Dryopteris intermedia*, " --- fine hairs tipped with round glands looking like Lilliputian hatpins --- " (p. 234). *Dryopteris juxtaposita* - "Politely speaking, it does not stand out in a crowd" (p. 234). "Where hardy, this fern is a magnificent soloist for the green symphony" is the elegant praise for *Dryopteris koidzumiana* (p. 235). George Schenk's contributions are equally elegant – "It sneaks into flower pots and planters already planted with something the gardener treasures, and there it elbows out the rightful occupant as callously as any cuckoo chick. Yet there are places where its invasion is a betterment, places such as the stone wall which it dresses with fine greenery at no cost to the gardener other than grooming the fern about once a year" is part of his description of *Pityrogramma calomelanos* (p. 305). Would that it were weedy in temperate gardens!

Fern photography is far from easy. Typically there is too much shade, too much harsh midday sun (creating unpleasant contrasts), too much wind (ferns start to waft at the slightest breeze), or too small a specimen to achieve a reasonable depth of field. Added to that, there may be insufficient time for composition, and the carrying of accessory equipment may be impractical or inappropriate (the author admits to rarely using a tripod or flash). It is therefore remarkable what a high standard of imagery has been achieved in these pages. With very few exceptions, the photographs are sharp, beautifully composed, aesthetically pleasing, relevant in context, accurately identified, and helpful and informative. Some examples of the latter category at a detailed level are – the comparison of the lower pinnae on the fronds of 5 very similar *Dryopteris* species (p. 220), the green spores fallen from a fertile frond of *Osmunda cinnamomea* (p. 285), the close up to show ripe sporangia in a *Polystichum* (p. 323), and the use of arrows in several photographs to highlight diagnostic features. At the other end of the scale there are some fine habitat shots of ferns both in the wild and in a garden setting. This book excels in terms of the quality and quantity of its illustrations, and is a fine example of the production qualities now being achieved in the horticultural/botanical titles from Timber Press.

If there is another highlight of this book, it has to be the quality of the horticultural advice accumulated over many years of practical experience. Although this far outweighs my own, I did find myself nodding in approval and admiration when reading the cultural advice for those species that I have grown. Her allocation of hardiness zones seems spot on, although I have always felt that we need a little more guidance here in Britain by splitting zone 8 into sub-zones. Much of the British Isles is classified as zone 8, although the climates and growing conditions within this area are far from homogeneous. The author observes this variability within all zones in her thoughtful introduction to hardiness (p. 34), where she discusses the climatic extremes of winter cold and summer heat and drought. She also expertly covers such issues as planting, fertilizing, composting and mulching, and trimming and grooming. My summer project now will be to check the growing conditions of my own plants against the advice given in this book, and make adjustments accordingly. I suspect quite a number of changes will be required!

This book has joined (perhaps exceeded) the exalted ranks of the classic gardening fern books of our era from Mickel, Rickard and Hoshizaki & Moran, and is highly recommended. It is beautiful to look at, entertaining to read, comprehensive, and highly informative - in a word essential to anyone who grows ferns seriously.

BOOK REVIEWS

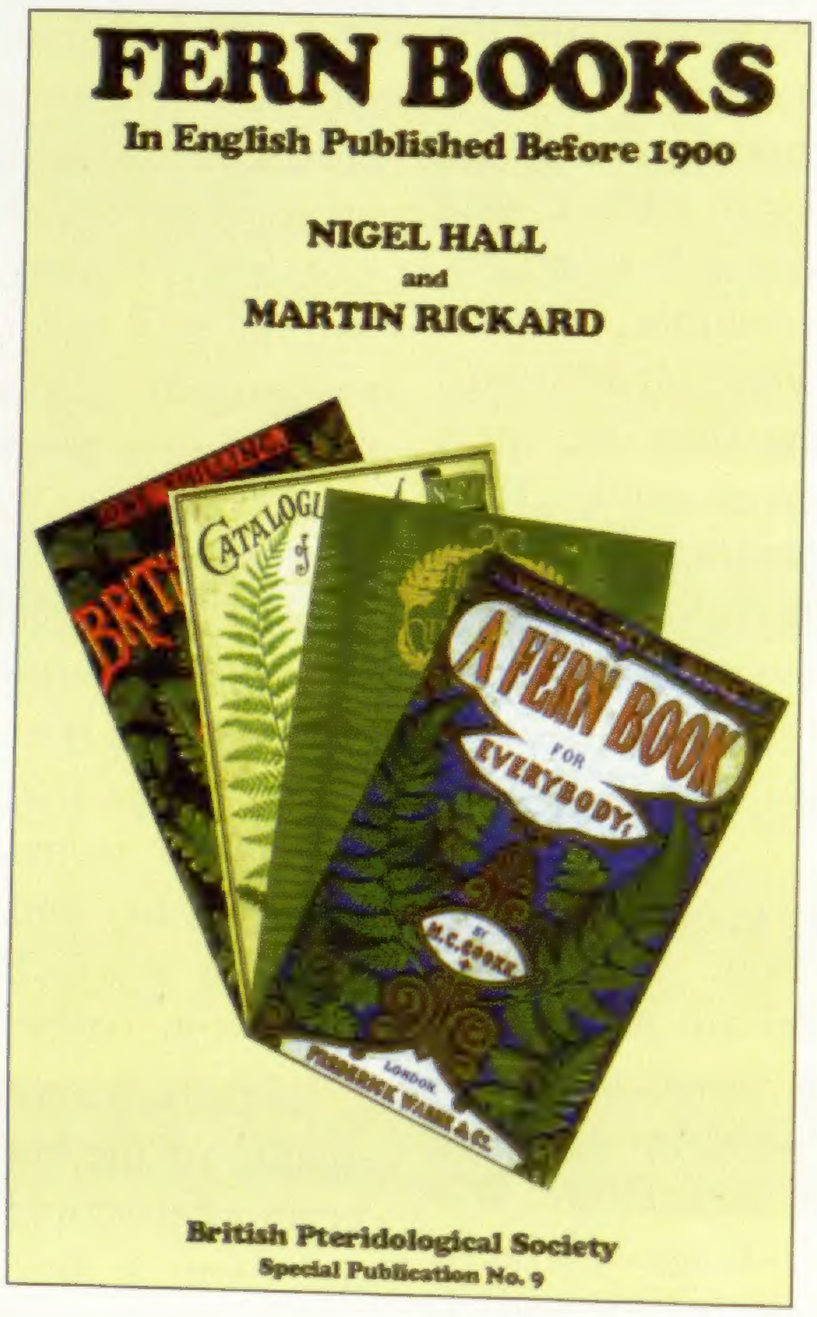
FERN BOOKS

and related items in English before 1900

Nigel Hall & Martin Rickard

BPS Special Publication No. 9, 2006

Reviewed by
Clive Jermy



This book is a catalogue, mainly of books published before the year 1900, but also of lists of live plants sold before that date by dedicated fern nurseries in Britain and Ireland. Also included are a number of albums of dried pressed fronds, species by species, some simply mounted depicting a single species, and others presented as a bouquet – several species attractively mounted with mosses, selaginellas and clubmosses. They were often produced by plantation owners, colonial servants and the like who found ferns abounding in wetter and warmer climes and collecting them an interesting pastime. Later, the pastime could become lucrative, as the albums nicely accompanied the Wardian Cases in the drawing rooms of the well-to-do in London. They had little scientific value but became collectors' items again in the later 20th century.

Items are arranged alphabetically under 110 authors (plus another 7 books of anonymous authorship). For each book, Hall and Rickard have also listed not only further editions but also in substantial works, different dated reprints (reissues), giving full details of publishers, book price, technical descriptions of the binding and book design, artists involved in the illustrations and suchlike. Information on print-runs is virtually impossible to get but there is no doubt that when we see how many reprints were made there were a lot of people out there interested in ferns and in growing them. This librarian-orientated information definitely reflects the collector spirit and can be said to be for the enthusiastic collector of books. Often Nigel Hall has hit upon useful information about the sequence, and thereby the date, of publishing parts (many books were published in this way to maintain buyers interest and author's cash flow!). This date is very significant when new names are published for species and varieties and where the earliest published name takes precedence, making this book useful to those that research the scientific naming of plants.

But this book is much more than being about books: it is also about the people who wrote those books. Under each Author entry is a potted biography and useful references to the source of that information is also given. Under each book entry is a description of that book's contents and usefulness to the reader, gleaned from often several reviews written at the time that book was published. This information is revealing; it tells us something about the writer by a contemporary botanist – maybe a friend, maybe a rival – but always revealing about both the author – and often the reviewer! In the nineteenth century, reviewers were prepared to speak their mind as did one reviewing Edward Lowe's *Ferns: British and exotic*: 'The text may be said to be contributed by the compiler's library'. These fascinating glimpses of botanists of yore made the book difficult for the present reviewer to put down.

This book took 30 years to bring to the press, mainly due to Nigel's other academic commitments. It is a scholarly appraisal of research that involved delving into some of the most exciting libraries both in the UK and abroad. The concept of the book was discussed with Martin early in its making and his knowledge from some 40 years of fern book hunting and buying showed him to be a critical and worthy co-author. It may have the occasional gap but for the fern enthusiast it's a jolly good read.

FERN BOOKS and related items in English before 1900

by Nigel Hall and Martin Rickard

British Pteridological Society Special Publication No 9, London. 2006. 98 pages, 4 colour plates and numerous b&w illustrations throughout the text.

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MALE FERNS 2007

James Merryweather

**'The Whins', Auchtertyre,
by Kyle of Lochalsh IV40 8EG**

Fraser-Jenkins, C.R. (2007). The species and subspecies in the *Dryopteris affinis* group. *The Fern Gazette*, 18(1) 1-26.

This new monograph (Fraser-Jenkins, 2007) is thorough, authoritative and very welcome. It contains much vital information, including full descriptions and complete synonymy with authorities, but also a lot of detail that the field pteridologist need not necessarily know. Here I will explain the male ferns in the terms that have enabled me to understand them and to extract from the monograph what is essential for male fern identification and recording in Britain.

We have five distinct male fern species in this country. Eight taxa in total are now recognised. Two species are represented by more than one subspecies (Table 1). *Dryopteris affinis* subsp. *paleaceolobata* is relatively common, whilst *D. affinis* subsp. *kerryensis* and *D. cambrensis* subsp. *pseudocomplexa* are probably rare.

Table 1. British Male Ferns after Fraser-Jenkins, 2007 (where all names and authorities may be found).

SPECIES	SUBSPECIES
DRYOPTERIS OREADES Mountain male fern	***Dryopteris oreades* subsp. *oreades***
DRYOPTERIS FILIX-MAS Common male fern	***Dryopteris filix-mas* subsp. *filix-mas***
DRYOPTERIS AFFINIS Golden male fern	***Dryopteris affinis* subsp. *affinis*** ***Dryopteris affinis* subsp. *paleaceolobata*** *Dryopteris affinis* subsp. *kerryensis* (rare, Eire)
DRYOPTERIS BORRERI Borrer's male fern	***Dryopteris borreri* subsp. *borreri***
DRYOPTERIS CAMBRENSIS Narrow male fern	***Dryopteris cambrensis* subsp. *cambrensis*** *Dryopteris cambrensis* subsp. *pseudocomplexa* (rare, Scotland)

Therefore, we need only consider the five male fern species with which we are already familiar, keeping our minds open, if we wish, to the probability that some specimens of *Dryopteris affinis* will turn out to belong to its subspecies *paleaceolobata*. Subspecies identity need be of interest to specialists only, because recording systems rarely require identification below the species level. Such ferns will be included under the appropriate species name

The var. 'Robusta' of *D. borreri* was ditched many years ago. Although plants can be found which match its description, there is so much variation in this species (as one might expect in any population of people, potatoes or teapots) that plants that differ slightly from descriptions can be considered as 'noise' that is to be expected if one gets to know intimately and classify any group of organisms.

So, the classification is relatively simple (!), but identification in the field is as difficult as it ever was. I recommend that amateurs (I am one) use the key supplied in his paper by Christopher Fraser-Jenkins with caution, for it is not meant for field use. I have done my best to construct identification systems that will enable the user to separate the five male fern species in the wild (see references). After many years of testing and correction, I think they work as well as any, although nobody can guarantee a successful identification for every specimen. That is impossible because some plants require laboratory confirmation for 100% confidence, and variation can confuse.

But it is usually possible to tell one sort of male fern from the rest, particularly if you get to know them well by doggedly working at plant after plant after plant. Eventually, you can do them from a fair distance or even at speed as you drive down country lanes. You can test and enhance your competence by routinely stopping to ratify these jizz-identified plants.

IDENTIFICATION

What Makes Male Ferns Difficult?

There are good reasons why we find male ferns difficult to differentiate.

Similarity. Male ferns all look pretty much alike until you get a grip of subtle differences.

Variation. There is a lot of natural variation within each species and differences are not always discrete because some characters overlap in their extreme states.

Light & Shade. Male fern morphology changes according to where the plant is growing. In the shade of woodland the fronds tend to be softer and more slender, the lamina greener (less yellow), and pinnules broader and more deeply lobed. *Vice versa* in the open.

Hybridisation creates intermediates that resemble both of their parents that were difficult to tell apart in the first place.

Apomixis. The three 'dark spot' species *D. affinis*, *D. borreri* and *D. cambrensis* all have a reproductive process they inherited from an ancestor - apomixis - in which a sporophyte sprouts vegetatively from the tissue of the prothallus. This facility is transferred to offspring, even hybrids that might otherwise never reproduce and are, in consequence, able to proliferate. After a few generations, descendents of hybrids natural-selected for survival produce significant numbers of good spores. A hybrid can become a viable species, such as those in the *D. affinis* group.

Evolution. *D. oreades*, *D. wallichiana*, *D. caucasica* and *D. filix-mas* (all involved in the evolution of British male ferns) may be relatively stable species – though the last is a fairly recent neophyte, perhaps post-glacial and, therefore, less than 100,000 years old. Evolutionary processes have been and are occurring rapidly within and between the male ferns. The *D. affinis* group, in particular, is changing and radiating, establishing and becoming extinct, all around us. Indeed, it could well be that *D. cambrensis* was naturally synthesised somewhere in the UK last year and will be, again, in 2007. For a newcomer to be added to the relatively more ancient taxa requires only that a new male fern should become numerous enough to be noticed by us. Nature has been inventing male ferns for millions of years by combining and segregating existing genes, and is doing so now.

Diagnosis. Some basic diagnostic features that keys have habitually relied upon (e.g. presence or lack of a dark spot at the junction of costa and rachis) do not always hold true, whilst real differences are often slight and, therefore, difficult to define with exactness (unequivocally, objectively). Accuracy of definition is not a problem to be shirked, but a challenge to be relished.

Because of this apparently insuperable problem, some identification keys rely too heavily upon subjective diagnostic characters, that is the descriptions require that one already knows a range of character states, has perfect colour vision and can resolve subtle differences. The reason people turn to identification keys is because, of course, they do not yet know these differences. Therefore terms such as: *leaves large for size of plant*; *scales ginger* or *reddish gold*; *pinnules crowded* or *not crowded*; ± *thick* versus ± *thin*; *fruits frequent*; *pinnae long-acute* or *shortly acute* or even *somewhat acutely pointed* are entirely unhelpful.

Some key compilers forget to consider that the primary purpose of an identification key is to *enable* the user to identify an unknown specimen. Many people learn to hate keys, often because they have tried and failed to use keys that look impressive, but simply do not work. Unfortunately, they tend to blame their specimen for being too difficult or themselves for incompetence, rather than the inconsiderate author of the key.

Identification

I have taken on the workable key challenge and devised three aids to male fern identification. The first, which was (and probably always will be) extraordinarily difficult to compile, is a key, presented in full with comparison illustrations in *The Fern Guide* 3rd edition (Merryweather, 2007a) and in abbreviated form in *Key to Common Ferns* (Merryweather, 2005). The second is a spreadsheet for the comparison of characters, defined (objective) or for assessment in the light of experience (subjective). The third is a detailed visual guide for which I have taken hundreds of

Dryopteris oreades

Dryopteris filix-mas

IDENTIFICATION

Dryopteris affinis

digital photographs of 'typical' plants: those that most closely match the Fraser-Jenkins definitions. I have organised them into chapters on a DVD-ROM that tackles the entire British pteridophyte flora (Merryweather, 2007b).

These identification guides have been designed so that diagnoses depend as much as possible upon objective characters that have been defined as accurately as possible, with attempts to quantify the range of each character's expression. At the same time, I omit (or announce boldly) characters that are subjective and liable to mislead the inexperienced if they rely too heavily upon them. Therefore, pinnule and indusium morphology are defined as precisely as possible whilst scale colour and density are annexed apart from objective characters, to be used only as additional guidance.

Dryopteris borreri

There are a few authoritative guides to which I have habitually referred during my own long journey towards enlightenment. They are listed in the references (*). Although the taxonomy has changed, the detailed information they present in their different ways is of inestimable value. Understanding improves greatly if you approach the male ferns from several different angles.

Chris Page's (1997) advice always bears repetition: "The satisfactory morphological identification of all of the British and Irish variants of this taxonomically very complex apogamous species [group of species] usually requires a symphony of characters to be taken into simultaneous account". That is, only by considering a full character set can any of these ferns be identified in the field *or* male ferns can't be separated properly by casually observing just one or two differences. Here is the reason my key is not entirely dichotomous, as I and everyone else would prefer, but was forced to become trichotomous at the final stage, the differentiation of the *D. affinis* group, the 'dark spot trio'.

Genealogy & Evolution

The ancestry and breeding behaviour of British male ferns, as understood at present, are rather complicated and incompletely understood, but when you get stuck in, the science reveals much about male fern biology that (I think) makes a fascinating, if mind-twisting study.

In the absence of apomixis, hybrid reproduction is rare, but it can be switched on in hybrids if another phenomenon, such as chromosome doubling, coincides with hybridisation. The cell division mechanism that produces the spores (meiosis) is, by and large, disabled by the combination of incompatible chromosomes from separate species, but it can snap back into action when doubling creates matching sets.

That is how we got *Polypodium interjectum* (a hexaploid species which has 222 chromosomes) from the hybrid known, when we find it today, as *P.* x *font-queri* (sterile triploid: 111) resulting from crossing of *P. cambricum* (fertile diploid: 74) and *P. vulgare* (fertile tetraploid: 148) with doubling (fertile hexaploid: 111 x 2 = 222).

Doubling during hybridisation is also how *D. filix-mas* became a successful. widespread species. It is a fertile tetraploid (164 chromosomes), having twice the chromosome product of its diploid parents *D. oreades* and *D. caucasica* (82 x 2 = 164). The hybrid, like the parents, would have been diploid or heading that way, had not something happened during meiosis that duplicated its chromosomes and made what we consider to be a distinct species.

Dryopteris cambrensis

IDENTIFICATION

D. oreades is reckoned to be the most ancient of our five male ferns, a British native species whose ancestry is unknown, but it was probably involved in the origins of all of our male ferns. Its ancestry can be defined with a genome formula: 'OO'.

D. filix-mas ('OOCC') is descended from the coalition of *D. oreades* and another species no longer found in this vicinity, probably *D. caucasica* (of eastern Europe and western Asia).

Each of the 'dark spot trio', has a different genealogy from the others. Even if there were no other reason, that alone should surely justify their status as separate species. It is thought that they are variously descended from hybridisation events long ago, involving our own *D. oreades* ('OO'), *D. wallichiana* ('WW'), a familiar garden fern, found wild in the Himalayas, and *D. caucasica* ('CC') (Fraser-Jenkins, 1996; 2007). The late Hugh Corley suggested that *D. crassirhizoma* might also have been involved (Corley, 1996, pers. comm.) whilst Clive Jermy (1999, pers. comm.) has considered that 'W' could have been either *D. wallichiana* or *D. crassirhizoma*. Further research is required before we will know for certain, but we have enough information to enable us to make some reasonably confident assumptions.

Thus the earliest ancestor of *D. affinis* is thought to have been the hybrid 'OW'. That of *D. borreri* is thought to have been 'OCW' and of *D. cambrensis* 'OOW'. Note that *D. cambrensis* is, therefore, not only an ancient hybrid *D. oreades* ('OO') x *D. affinis* ('OW') ('O' + 'OW'), but it could also be found, created *de novo*, in modern Britain. The recent hybrid might or might not be all over the country, but of course, we wouldn't be able to tell because it would be indistinguishable from *D. cambrensis*.

This scheme makes a lot of sense if you consider what the crosses between the various putative ancestors might have looked like and make notional comparisons between the modern species. The toughest, shiniest, yellowest, scaliest of the three, *D. affinis*, could well be a mixture of soft, rounded *D. oreades* and robust, angular, golden, glossy *D. wallichiana*. The next in robustness, *D. cambrensis*, we can imagine being *D. affinis* diluted by a second dose of *D. oreades* genes: softened a bit with lengthened, lobed pinnules. The least robust, *D. borreri*, looks most like *D. filix-mas* (influenced by its share of *D. caucasica* genes) but has some visually evident, but dilute relative to *D. affinis*, genetic influences provided by *D. crassirhizoma* or *D. wallichiana* that show up in its angular pinnule.

It was not until I had sorted this all out for my own interest (rationalised on the computer screen and on paper where I could scribble notes and arrows) that this background biology became clear and I was able to make progress in my own ability to recognise the five male ferns. I was and am still baffled by some plants that are either intermediate, perhaps simply because of fine genetic variation or – and total misfits do turn up occasionally – because some individuals do not slot into this convenient scheme. I think it is possible that these oddities are male ferns with ancestries different from those under discussion here, but I will not stick out my neck and say so. We should not worry unduly about anomalies, but be content (!) with the five species until specialists publish descriptions of as yet unknown taxa, whilst keeping our eyes and minds open for unfamiliar forms to which we can't apply a name.

Breeding & Hybridisation

D. oreades and *D. filix-mas* both reproduce sexually; their prothalli have both male and female organs. The 'dark spot

Dryopteris wallichiana

Dryopteris crassirhizoma

trio' lack archegonia (female), but since they have antheridia (male) and can produce antherozoids (sperm), they can cross sexually with the two hermaphrodite species, *D. oreades* and *D. filix-mas*, creating hybrids (one way, as male parent only).

This is, of course, what did and still does happen. What follows in this and the following paragraph is but a distillation of what may be read in completeness in Fraser-Jenkins, 2007. Hybrid plants, crosses between *D. filix-mas* and each of the 'dark spot trio' turn up reasonably frequently. Thus we find *D.* x *complexa* (*D. filix-mas* x *D. affinis*) which has been found to occur with both of the common subspecies of *D. affinis*. We also find *D.* x *convoluta* (*D. filix-mas* x *D. cambrensis*) and *D.* x *critica* (*D. filix-mas* x *D. borreri*). The last seems to occur more or less wherever the parents cohabit, which they frequently do.

Recently created *D. oreades* hybrids have yet to be found. If it is ever recognised, only one, *D. oreades* x *D. cambrensis*, is likely to stand out as different from all the rest, for *D. oreades* x *D. affinis* is the same as *D. cambrensis* and *D. oreades* x *D. borreri* would wind up with the same combination of genes, reshuffled, as *D.* x *complexa* (*D. filix-mas* x *D. affinis*).

Any hybrid produced thus is likely to be sterile (producing disfunctional spores) as are conventional hybrids, so that these plants are unlikely to be able to procreate by sexual means. However, some spores can be viable and the ability to reproduce asexually by apomixis might be expressed, so clonal propagation is a possibility. This might be be a rare occurrence, but if not, every hybrid could give rise to a population of a novel male fern (a species?), each with the potential for geographical expansion and longevity. We do not know whether or not we have the situation faced by experts dealing with dandelions, hawkweeds and other tricky plant complexes, in which there are not a mere eight similar types, but hundreds! Maybe not, but if that is actually happening, it would be another, burdonsome, reason why male ferns are difficult.

A few hybridisation events have resulted in fertile or partially fertile offspring (they produce good spores, if only a few) such as *D. filix-mas*, *D. affinis*, *D. borreri*, *D. cambrensis* and other male fern species found around the globe. Where parental ferns coincide, for instance *D. oreades* and *D. wallichiana*, a hybrid, which is actually *D. affinis*, can be created again and again. This *D. affinis* produces at least a few viable spores so, although its prothallus only ever has male organs, apomixis allows it to reproduce. Its spread across the landscape is constrained by geographical or climatic boundaries.

Similar events can occur in total isolation on different continents. Hence the Mexican male fern *D. pseudofilixmas* so closely resembles *D. borreri* that it seems likely that it contains gene sets from the same parents, though with an array of minor differences accumulated during geographical isolation (Fraser-Jenkins, 2007). Hybrid fertility may be rare, but given millions of years, a few can become numerous breeding hybrids, such as we witness in our native *D. affinis* complex.

Past & Future

In 1995 Adrian Dyer and I asked a range of fern biologists: 'What should we do about *Dryopteris affinis*?' (Merryweather *et al.*, 1996) and seven years later I proposed some answers (Merryweather, 2002). Now we have the authoritative taxonomic treatment from the undoubted expert Christopher Fraser-Jenkins, but there is still a lot more to learn. We have an effective up to date model with which to work in field and lab. As recorder expertise improves, updated distribution maps will become increasingly convincing and they, plus other data yet to be gathered, will help us learn a lot more about the evolution and ecology of these fascinating and beautiful ferns.

Chris Page has recently observed: "The whole picture of the male ferns is complicated because we are dealing with a group which appears to be in a particularly active state of evolution (and any group in such a state is a basis for taxonomic complexity), and ideas about best ways to treat such a group are themselves likely to evolve with time, as these have done. The study of such a group is important (and BPS members should not be 'put-off' by this need for an internationally accepted taxonomy) because such groups have a lot to teach us about the processes involved in fern evolution, and this has been the driver of much scientific interest in ferns (and especially so in Europe) over the last half-century."

Look out for the next important male ferns article, due from the joint pens of Fraser-Jenkins and Trewren. Ken has some deep and as yet unpublicised insights into male fern biology. From where we find ourselves in 2007, we can only make progress.

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Tree-Fern Newsletter No. 13

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Hyper-Enthusiastic Rooting of a *Dicksonia*

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In late 2004, about two and a half years before taking the left-hand photo, I had bought a *Dicksonia antarctica* with a fat trunk about 5 feet high.

Following the usual recommendations for planting, I buried the base about one-foot deep in the ground. However, because of its location on my allotment and the difficulty of guaranteeing daily watering, I was worried it would dry out. So I installed a cylinder of chicken wire, a good bit wider than the trunk, and reaching about half-way up. The space between the trunk and the wire was filled with partly-decomposed tree chippings, which were kept moist during the ensuing period.

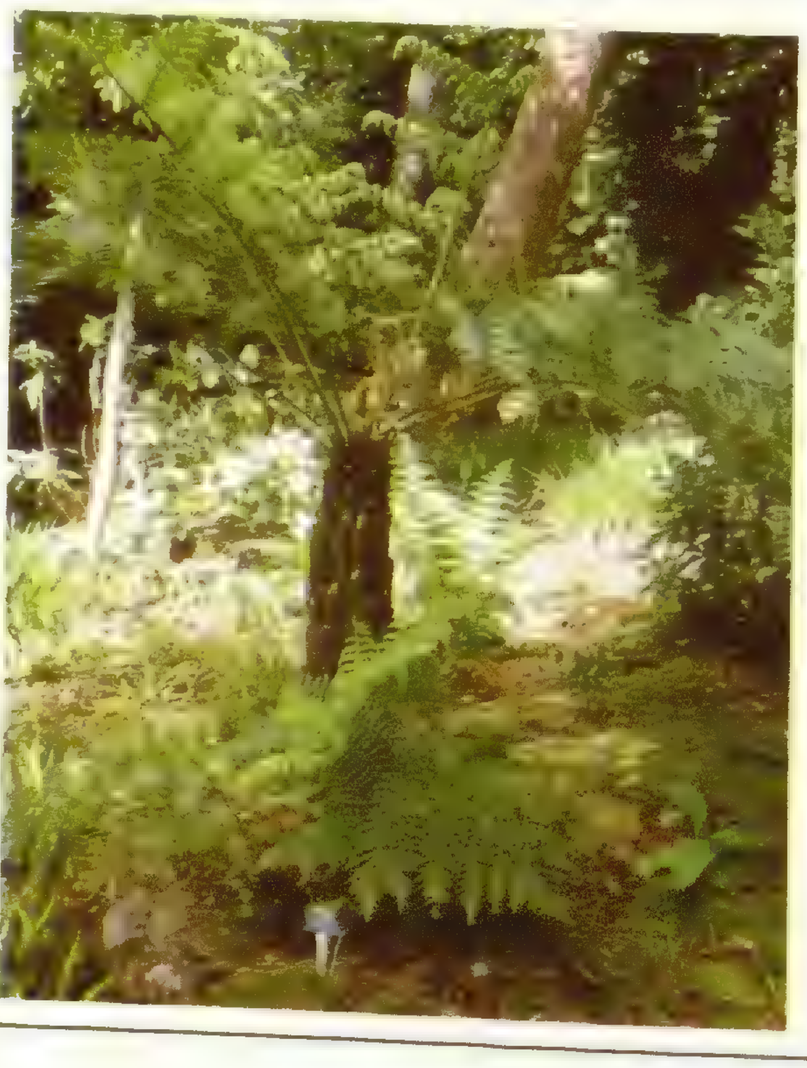
In the spring of 2007 I decided to remove the chicken-wire frame and this is what I found (below)! The tree fern had grown an extensive root system into the tree chippings.

I assumed that it would also be well-rooted below ground and therefore trimmed off some of the lower bulge to make it look better. So far, all seems to be well, and the slimmed-down trunk looks quite normal (below).

Most Northerly, Outdoor-Growing, Tree Ferns on Earth?

I offer the plants pictured here as likely to be the most northerly, outdoor-growing, tree ferns on planet Earth.

They are happily rooted at Latitude 57°49' N in the woodlands of the National Trust for Scotland Inverewe Garden, near the village of Poolewe, in North-West Scotland. (A.C.W.)



Left to right: ***Dicksonia fibrosa*, *Cyathea australis* and *Dicksonia antarctica***, the last-mentioned, one of many.

Dicksonia x *lathamii*

A. R. (Matt) Busby

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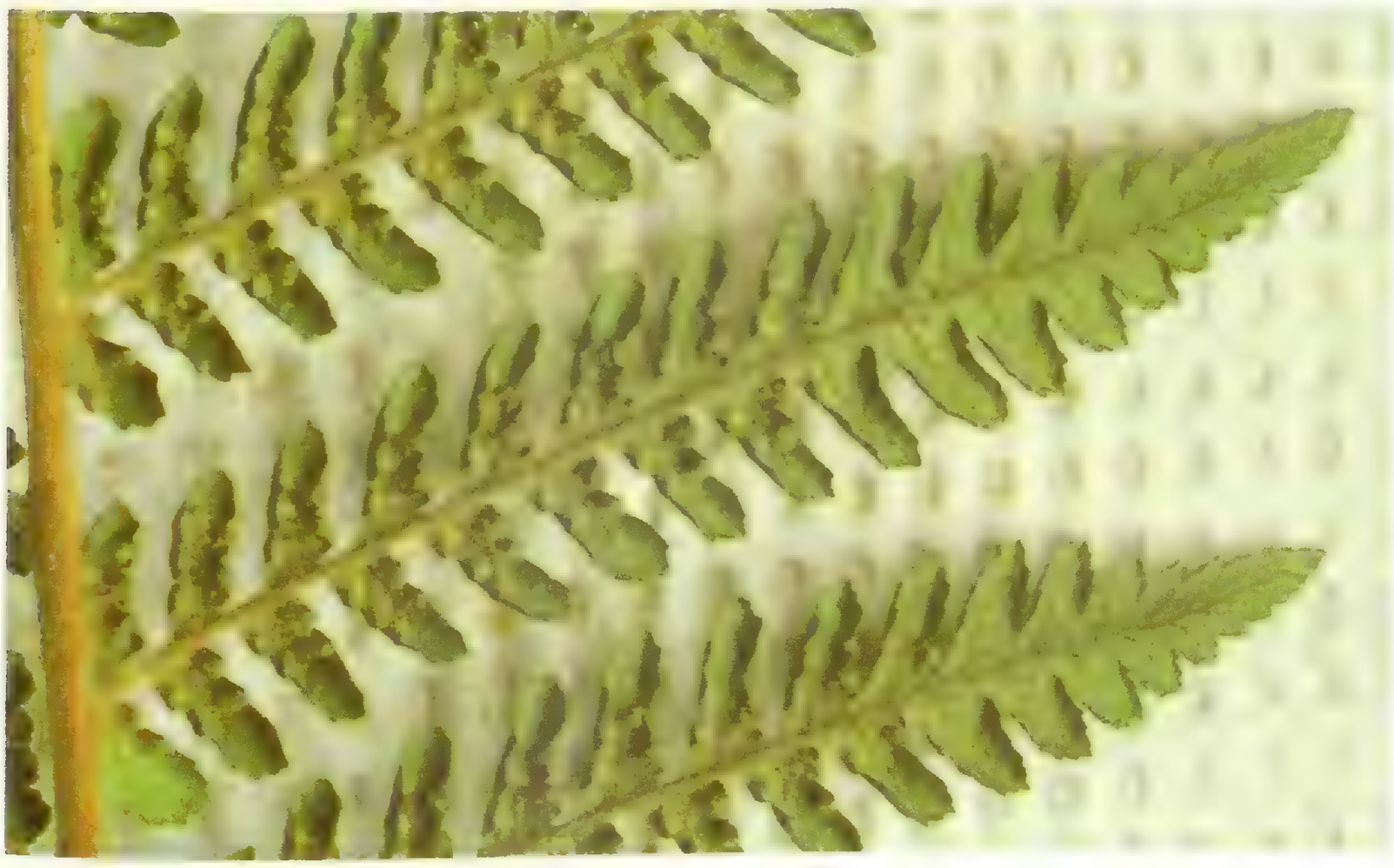
This unique, hybrid tree fern is a cross between *Dicksonia arborescens* from St Helena and the Australian *Dicksonia antarctica*. It has been grown for over 120 years as a single plant in the glasshouse at Birmingham Botanic Gardens. The name commemorates William Bradbury Latham who was born in Essex in 1835 and became curator at the Gardens in 1868. He was a keen hybridiser of plants, particularly orchids but his great achievement was *Dicksonia* x *lathamii* which was described in the *Gardener's Chronicle* of 28 November 1885 as follows:

Some years ago I had under my care a plant of the very rare *Dicksonia arborescens*, an imported plant, with a clear stem of from three and a half to four feet in height, [90-120cm] and having so completely the character of that figured in Hooker's *Species Filicum* (i.,t.22) that I have no doubt it was the true plant. I collected spores from this plant and sowed them in a 5-inch pot, at the same time sowing in another pot of similar size some spores of *D. antarctica*. These pots were placed side by side.

In due time the prothallia came up very freely in the pot of *D. antarctica* but not so in the case of *D. arborescens*. Amongst those in the pot of *D. antarctica* I noticed two very distinct from the rest, and these I carefully watched from day to day, and when at length the first little frond made its appearance I was delighted to see something different from the rest and what then appeared to be *D. arborescens*. For some years after, while the plant was in a young state, it was supposed to be the latter plant, but when it began to develop its stem and the fronds grew to their full size, I saw that it was distinct and had combined the characters of *D. antarctica* and *D. arborescens*, which I now believe to be its parents, the spores in some way having got mingled in the seed pot.

In the texture of its fronds it is very much like *D. arborescens* but the general character of the plant, taken as a whole, comes nearest to *D. antarctica*, the stem quite resembling that of the latter, only being stouter, while *D. arborescens* on the other hand has a thinner, more slender stem in the way of that of *D. squarrosa*. The habit of throwing up the young fronds one after another and not all at one time to form a new crown of foliage, is also foreign to *D. antarctica*, and more nearly resembles the mode of development in *D. arborescens*.

I have been visiting the *D.* x *lathamii* since the 1960s and found the plant in good health as recently as August 2006 (see photo). Regrettably, *D. arborescens* has long since disappeared, but the hybrid can be compared with a large *D. antarctica* growing nearby. I confirm Latham's observations on new fronds being produced one-by-one, unlike *D. antarctica*.



Underside of three pinnules of *D.* x *lathamii*, showing the distinct pinnulets.

Over the last few years the plant has grown close to the glazing of the glasshouse and some of the fronds are becoming distorted. I was pleased to see that steps are being taken to reduce its height within the next few months. This need must have arisen many times during the long life of this truly unique tree-fern.

Composite photo of *Dicksonia* x *lathamii* taken on 8 August 2006 in the glasshouse at Birmingham Botanic Gardens. Note the stepladder needed to collect a sample of frond!

Detailed biographical information on William Latham was given in a previous article, which also reported my observations on spores from this plant. Microscopically, these were white, poorly developed or badly wizened but apparently with a tiny percentage of healthy golden brown spores which may be viable. [Busby, A.R. (1984) *Pteridologist* 1(1): 8]

Dicksonia x *lathamii* as illustrated in 1885, and apparently not re-published since.

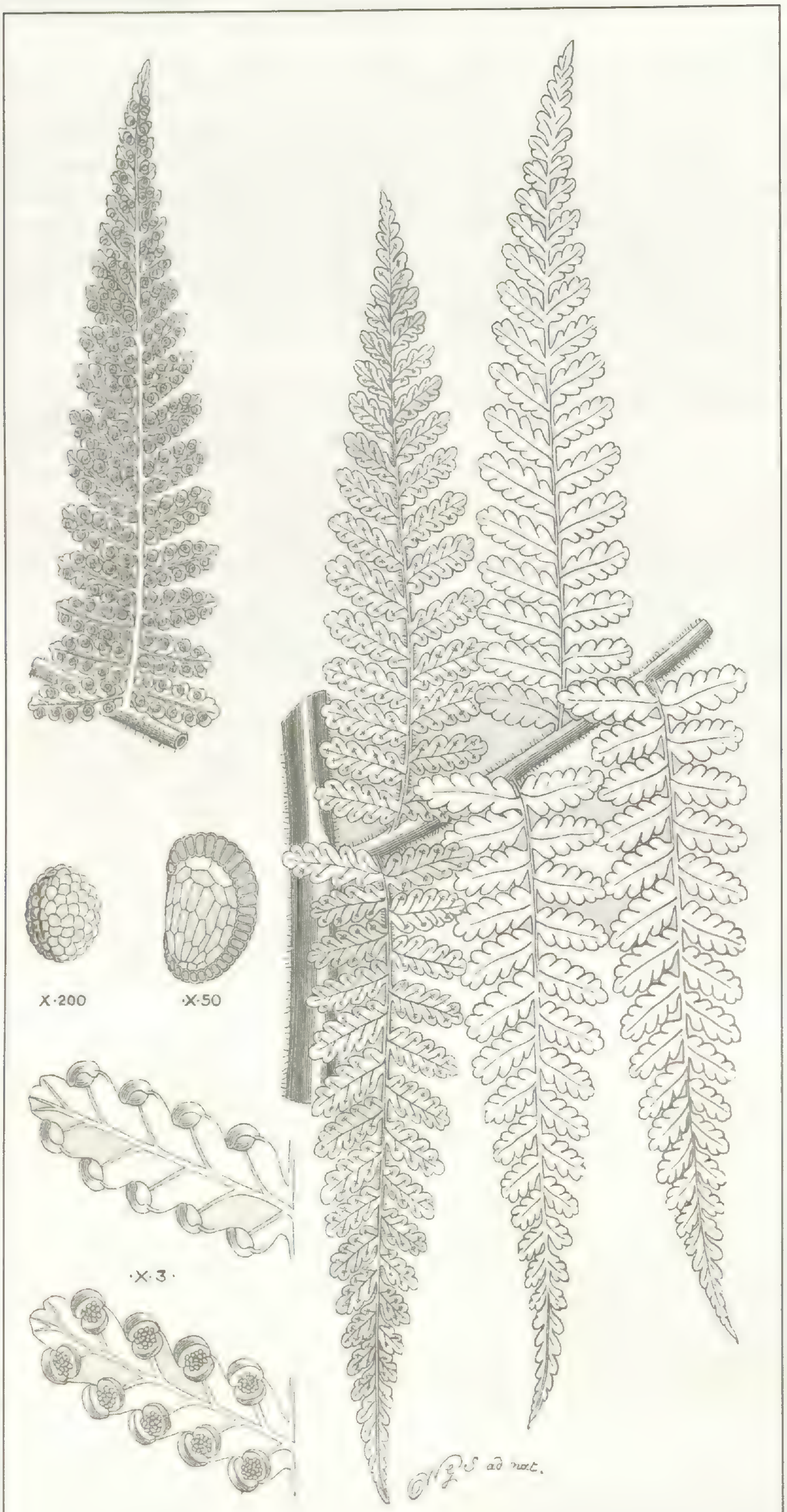


FIG. 154.—DICKSONIA LATHAMI.

Line drawing of *Dicksonia* x *lathamii* from the *Gardener's Chronicle* of November 28 (1885) p. 689. (reproduced by permission of the Editor of *Horticulture Week*).

***DICKSONIA LATHAMII*, n. hyb.**

Technical description by Thomas Moore, of Chelsea, in the *Gardener's Chronicle* of November 7 (1885), p. 584. (reproduced by permission of the Editor of *Horticulture Week*.)

Arborescent evergreen; **fronds** tripinnate, coriaceous, narrow oblong, 14-15 feet long, including stipes; dark green on the upper surface, paler beneath; **pinnae** alternate, often unequally distant, sometimes nearly opposite, sessile, oblong-lanceolate, broadish at the base, acuminate, the middle ones 1½-2 feet long, 6-8 inches broad, divided into rather close-set pinnules, which are also sessile; **pinnules** linear-oblong, narrowed to a point at the apex, about ¾ inch, or in the basal ones 1 inch, broad, the upper portion decrescent and confluent; pinnulets distinct, roundish or oblong-obtuse, the lowest with a narrow attachment, the rest more or less adnate, the margin in the fertile contracted portions distinctly crenato-lobate, each crenature or lobe bearing a sorus; the sterile parts pinnatifid, with falcate oblong-acute lobes, indistinctly toothed at the apex; **sori** six to eight on each pinnulet, globose, the green outer valve (tip of lobe) somewhat larger than the brown inner one, both entire; **veins** in the fertile parts simple, one to each lobe, from a stout costa, which is prominent on the lower surface, in the sterile parts more or less forked; **stipes** 4 or 5 feet in length, clothed abundantly in the younger stages with bright rufous hair-scales, and as well as the **rachis** very stout, pale brown, with a central furrow above, deeper umber-brown, and bluntly rounded behind, the surface minutely asperous, the main and secondary rachides tomentose, with fine crispy deciduous hair-scales, the secondary and tertiary ones comparatively thin, also asperous, with a few scattered hair-scales along the base of the pinnules.

Acknowledgements

I am indebted to Mr James Wheeler and the Gardens staff of Birmingham Botanic Gardens for their assistance in obtaining material from the plant.

Tree-Ferns at Kells House Garden in South-West Ireland

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Fig. 1. Welcome to Kells House Garden!

Some of the best tree-fern gardens in north-west Europe are in the far south-west of Ireland. Nowhere else in the British Isles enjoys such a moist and mild climate. For maximum advantage, gardens need ideally to be at or near sea level, and sheltered from Atlantic gales. Several gardens in such sites have been developed over the past century and, even after periods of neglect, many introduced plants notably tree ferns, have thrived. Neglect may even be a good way to manage tree ferns in these situations, since the thick vegetation grows up rapidly to provide shelter and humidity. However, excessive competition may prevent establishment of young sporelings.

Fig. 2. Billy Alexander beside a well established *Cyathea cooperi* lurking in the undergrowth.

In the summer of 2006 I had the good fortune to revisit two of the best tree-fern gardens in the region – Kells House and Rosdohan. I had visited both in 1991, and Rosdohan again in 1999; so to revisit in 2006 after 15 years gave me a chance to monitor developments. My 1991 visit coincided with the publication of *Ferns in Your Garden* by John Kelly – a book that features several of the ferns in the garden at Kells.

Fig. 3. Newly planted *Cyathea australis*

Kells House Garden in 1986 was the source of my own very first tree fern with an actual trunk (a *Dicksonia antarctica*), although I had earlier been given smaller and untrunked plants from Glendurgan in Cornwall and Ray Coughlin in Bromsgrove.

The plant from Kells was a gift organised by the greatest of modern-day plant hunters, Christopher Fraser-Jenkins. It was not surprising therefore that during my first trip to Ireland in 1991, Kells was high on my list of places to visit. At that time the garden was fairly tidy, especially near the house. The owners, the Vogel family from Germany, were

keen on the garden and had a smallish nursery specialising in rhododendrons. Tree ferns were appreciated but not considered anything special. In 1991 I remember seeing only *D. antarctica*, but in abundance! There were hundreds of specimens, with trunks from 3 to 12 feet tall and many, many sporelings with no trunks but huge fronds often six feet long. We commented at the time that this wonderfully-sheltered site had great potential for growing additional species of tree fern and indeed over the years, Herr Vogel did plant several others.

Fig. 4. Recently planted *Cyathea atrox*.

By early 2006, Kells was a very different place. Herr Vogel had sadly died rather young and, by the time the property was put up for sale, it had largely reverted to a wilderness. It was then bought by Billy Alexander (Fig. 2), a keen businessman and nurseryman from Dublin, specifically to develop the garden – and the tree ferns! I have known Billy for a few years and he invited me over to have a look round, an invitation I was quick to accept.

By mid-summer of 2006, when I arrived, Billy had already started to clear back the now rampant vegetation, for the garden had obviously been neglected. The drive to the house was clear, with some stunning, long-established *D. antarctica* (Fig.1) but, more exciting, were the groups of newly planted *Cyathea australis* (Fig. 3), one with a trunk about 12 feet high.

Near to the house is a small walled garden where I remembered some wonderful *D. antarctica*, and I was delighted to see that they are still there, the largest about 20 feet tall. Billy has added *Cyathea cooperi* nearby. It is a 4-feet trunked specimen only planted in 2006, but the crown looked damaged and it only had one small deformed frond. Billy was confident it would pull through (it did!).

Billy has also recently added two six-foot specimens of *Cyathea medullaris*, which were just starting into growth during my visit, one in the walled garden and one just outside. The latter can be seen in Fig. 6 (background, centre).

Behind the walled garden is a hillock absolutely covered in *D. antarctica*. There must be in the region of one hundred, some with trunks up to 10 feet tall, and one or two with bent trunks, all quite magical (Fig. 6).

Planted nearby were a few other species, all I believe by the Vogels after my 1991 visit. Most notable is *Dicksonia squarrosa*, thriving with a 15-foot trunk.

Billy has done some clearing work on the eastern side of this hillock and planted numerous young plants of additional species, mostly cyatheas. Many have about one foot of trunk. Hopefully in the Kells environment they will soon bulk up and look more robust.

Many of these plants have rarely, if ever, been successfully grown outside in north-west Europe and I shall therefore watch progress at Kells with great interest. Species on trial include (trunk height in inches) *Cyathea atrox* (18), *C. dregei* (6), *C. inciso-serrata*. *C. milnei* (18), and *Dicksonia youngiae* (15).

At the far side of the hillock there is a 'lawn', more accurately described as a 'grassy spot' at the time of my visit. Here there is a tree covered from foot to almost its head with *Microsorum diversifolium*, a wonderful sight!

Fig. 5. A strong-growing *Cyathea dealbata*.

Fig. 6. Magically-twisted trunks of *Dicksonia antarctica*.

Fig. 7. *Dicksonia antarctica* in the walled garden.

Tucked away in the bushes nearby is another well-trunked *D. squarrosa*, and a very sturdy but only short-trunked *Cyathea dealbata* and *C. cooperi* (Fig. 7). From here a drive leads directly away from the house mainly following the course of a large stream. Tree ferns become less common here although there are still some very healthy *D. antarctica* and a fine *C. dealbata* (Fig.8*)*. The latter had around 20 fronds, perhaps 9 feet long but, surprisingly, virtually no trunk; it must be a tolerably old plant. Curiously I don't recall seeing any *Dicksonia fibrosa* or *Cyathea smithii*, but I may be mistaken.

There are surprisingly few other ferns for such a luxuriant warm temperate site as this. There is a nice clump of *Paesia scaberula*, although it is now smaller than in John Kelly`s 1991 photo. *Polystichum polyblepharum* (also photographed by John Kelly) is thouroughly naturalised – reminiscent of Penjerric in Cornwall. *Woodwardia radicans* is rare but *Matteuccia struthiopteris* grows well in a hidden corner, as does *Blechnum chilense*. I must have overlooked or forgotten *Adiantum venustum* as John Kelly has a good photo of it from here. Of native ferns, the most interesting were *Hymenophyllum tunbrigense* on rocks by the stream, and nearby, *Dryopteris aemula*. There were another ten or so expected native species, but I could not find gametophytes of *Trichomanes speciosum* despite suitable habitats.

Billy tells me that since the summer of 2006, he has planted a large additional collection of both 'ground ferns' and tree ferns. These latter include two *Dicksonia fibrosa* (at last!), *D. berteroana*, *Cyathea tomentosissima*, *C. cunninghamii*, and two *C. smithii*.

Tree-fern-like species include, *Blechnum discolor*, *B. fluviatile*, *B. nudum*, *B. magellanicum*, *Leptopteris superba*, *Lophosoria quadripinnata* and *Marattia salicina*.

The current count of ten species of *Cyathea* and five of *Dicksonia* planted outside in north-west Europe is going to take some beating!

[Footnote: There was so much of interest at Kells House Garden that my visit to Rosdohan Garden will have to be described later.]

FOCUS ON FERNERIES

RENOVATED PALACE FOR DICKSONIACEAE

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Originally built in 1873, the vast iron-girdered glasshouse, known as the Kibble Palace, in Glasgow Botanic Gardens, was reopened in 2006. It had been totally dismantled to bare ground and the metalwork completely renovated and new glass installed.

It contains the *National Collection of Dicksoniaceae*, held under the authority of the National Council for the Conservation of Plants and Gardens (www.nccpg.com).

Interior of the Kibble Palace in June 2007. The agencies funding the restoration did not approve of lights mounted on the metalwork, because the cabling could not be concealed and was not in the 1873 Victorian original. Social events nowadays during hours of darkness therefore depend on the circular dispersion mirrors (mounted on the metalwork!) and lit by upward-pointing floodlights on the ground. They work very well.

An illustrated account of the restoration process with aerial photos may be found on the *Glasgow Parks* website: www.glasgow.gov.uk/en/Residents/Parks_Outdoors/Parks_gardens/KibblePalaceRestoration.htm

As part of a civic botanical garden, the Kibble Palace is intended 'to have something for everyone' and to allow for social and artistic functions in graceful surroundings. Tree ferns, overwhelmingly *Dicksonia antarctica* with some *Dicksonia squarrosa*, are displayed in inspirational abundance, together with ground ferns and a thematic selection of exotic flowering plants, marble statuary and traditional garden benches with squirrel-pattern metalwork.

On a recent visit I noted a goodly selection of quite a few other tree-fern species than the two mentioned, including the rare *Dicksonia arborescens*, the type species of the genus from St Helena. There were several *Cyathea* species and *Cibotium* species and a trunked *Sadleria*. Among the ground-fern horticultural treasures were *Osmunda banksifolia* and *Osmunda vachellii*, together with *Thyrsopteris elegans*.

Although labelling was well in hand when I visited, some specimens were still identified only by acquisition number. A full listing of the species in this excellent collection will have to be the subject of a later report.

Large *Cibotium splendens* at front right.

Seldom seen in horticulture: *Osmunda vachellii*, from China.

FOCUS ON FERNERIES

THE OLDEST FERNERY?

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In December 2006, a couple of days before I was due to give a talk on ferns to the Cardiganshire Horticultural Society in Aberystwyth, I was contacted by Pat Griffiths of Llanerchaeron Gardens in Ceredigion in West Wales asking if I would like to take a look at their ferns while I was in the area. Llanerchaeron is a National Trust estate set in an area of great natural beauty. In addition to its aesthetic appeal the estate had another great attraction for the National Trust – it had been largely unaltered for over 200 years.

I arrived on an awful day of horizontal rain – good ferning weather! After listening to a slide show on the interior of the house, Pat walked me round to the ferns. Initially it all looked pretty standard: lots of very mature plants of *Asplenium scolopendrium*, *Dryopteris filix-mas*, *Athyrium filix-femina*, *Dryopteris dilatata*, *Polypodium interjectum*, a few *Polystichum setiferum* and, perhaps surprisingly, quite a lot of *P. aculeatum*. Amongst these native species were young, recently introduced plants of a few Japanese species plus *D. filix-mas* 'Crispa congesta', all fairly readily available from nurseries these days.

Not a terribly exciting list, perhaps, but the fernery covered a large area. Possibly 50 metres long, it ran the length of the shady outside of one wall of the walled garden with a couple of extensions at either end. I could see no evidence that it had ever been covered. The main area was a long border cut by deep semicircular bays, the 'headlands' between the bays ended with a few plants of a Carex species (possibly *C. pendula*). Everything else was ferns and all could have been collected locally. The soil was banked up and liberally dressed with small round boulders, presumed to have come from the beach 2 miles away.

In December the *Asplenium scolopendrium* and *Polystichum* spp. were looking good and the appearance of the whole was still pleasant despite the late season.

At this point in the tale it is relevant to say something about the history of the house and garden. The house was designed and built around 1794 to 1796 by John Nash who loved to incorporate curves into almost everything he did. many rooms have curved walls – and the fernery has curved bays! Does this mean he designed the fernery too? The walled garden is believed to be contemporary with the house, so was the fernery in place at the same time? If so, it would seem to date from 1810 at the latest

Fern cultivars did not become widely available – or even fashionable, until around 1860, this fernery lacks any old established cultivars, further circumstantial evidence to suggest it was created before 1860. The plants that are in the fernery are extremely large. It is difficult to estimate their ages but ferns are perennial and in theory can live forever. Could these be the original plants?

Records of the development of the garden are apparently sparse but some information might be held in the National Trust archive. Until further information emerges I think this fernery is a rare survivor of a very early fernery, possibly from the end of the eighteenth century when ferneries were not fashionable. It might be the oldest surviving fernery in Britain, if so it is truly remarkable that such an old garden should survive in such wonderful shape for over 200 years.

Whatever the outcome of future research it is worth saying that the fernery at Llanerchaeron has a very pleasing ambience, the lack of more modern introductions is somehow very pleasing ... it has a simple beauty all of its own.

Footnotes: In view of the likely age and significance of this fernery I have recommended that the recently introduced cultivars and Japanese species should be removed to alternative sites in the garden. Where the planting is thin additional plants of the native species listed above can be added.

If anyone knows of other old ferneries I (and *Pteridologist*) would be very interested to hear about them.

STOP PRESS

THE BENMORE FERNERY

James Merryweather

The Royal Botanic Garden Edinburgh is about to restore the 1870s fernery at their Benmore Garden near Dunoon. This once magnificent structure is on two levels. with numerous planting 'shelves' on every wall and a deep grotto containing a specimen of *Cystopteris diaphana* of mysterious provenance, discovered and confirmed by Fred Rumsey.

Restoration will probably begin towards the end of 2007 and it is anticipated that *Focus of Ferneries* will report on and illustrate progress.

Benmore Garden will not disappoint pteridologists, who are encouraged to visit there as well as, of course. Ascog Hall Fernery on the nearby Isle of Bute.

http://www.rbge.org.uk/rbge/web/visiting/bbg.jsp

DISC REVIEW

British Ferns, Clubmosses, Quillworts & Horsetails

by James Merryweather

on DVD-ROM (for the computer)

£15

visit: www.merryweather.me.uk

free upgrades, as available, from the author

Reviewed by
Graham Ackers

When our Editor sent me this package for review, I pondered the politics. In the event of an indifferent review, he could potentially have a conflict of interests, whilst I might have a conflict of conscience. Fortunately, no such dilemmas surfaced, as this is a most enjoyable production - easy to use, entertaining to view, rich in content, and fine in photography.

On loading, the DVD dialogue provides the choice of either running from the DVD drive, or loading onto the hard drive. The latter is the recommended option, for ease and speed of use, and to permit the original DVD to act as a back-up. The load wizard is straightforward and quick, and subsequent navigation through the PowerPoint based program itself is very easy. Apart from the program itself there are the following support sections – Information, Checklist (of British pteridophytes), Diagnostics (table of male fern characters), Help (wherein load information is contained), and Acknowledgements. The Information section points out that the DVD is intended to supplement *The Fern Guide* (Merryweather, 2007).

There are 14 Parts – the first being the "Introduction", and the last "Ferns in winter". Two parts cover "Fern Anatomy", and the other 10 parts are arranged by the degree of frond cutting (7 parts) and the other pteridophytes not lending themselves to the frond cutting approach (3 parts).

The "Introduction" takes us through the evolution of pteridophytes, their interrelationships, the etymological derivation of "pteridology", the function of spores, and FAQs concerning the historical use of the word "fern", and the "male" "lady" fern derivations. In parts 3 & 4, the anatomy of rhizomes and frond structure respectively are covered comprehensively.

Each of the remaining 10 sections follows a similar pattern, but with different emphases depending on the relative difficulties of species identification. Typically there are profuse excellent photographic images of each species (far more than one could expect in any book). Illustrated and demonstrated are habitat, habit, key morphological features, comparisons for confusion avoidance (side by side images), different age classes, and reproductive structures with the sporangia development sequence: developing-ripe-spent. The sequences and images are presented creatively with the dynamic annotation of photographs using PowerPoint's arsenal of visual aids, but helpfully and not intrusively (I have attended some PowerPoint presentations where the content is eclipsed by a barrage of visual gimmickry!)

A particularly good illustration of this comprehensive approach is the sequence in part 9 differentiating between *Polystichum setiferum* and *P. aculeatum*, where a multitude of characters are demonstrated – habitats, frond shape and orientation, pinnule shapes and hairiness, angular relationship of the pinnule to the costa, and indusial characters. In this first DVD version, photographs for some of the rarer species are wanting or in short supply (e.g. *Isoetes histrix* and *Anogramma leptophylla*, restricted in distribution to the Channel Islands). However, this is not a serious shortcoming as all of our most significant pteridophytes are covered comprehensively.

In Parts 11 & 12, the male ferns *Dryopteris filix-mas*, *D. oreades*, *D. affinis*, *D. borreri* and *D. cambrensis* are compared and contrasted at great length (and quite rightly so!). Characters used are the shadiness of the habitat, frond appearances at different stages of unfurling, and the morphologies of the pinnae, pinnules and sori. The last three species covered comprise the "D. affinis aggregate", the identification of which is a continuing struggle for most amateur (and many professional) pteridologists, and this is given due recognition in their treatments. The taxonomy used is consistent with Fraser-Jenkins, 2007, although within that paper both *Dryopteris affinis* and *D. cambrensis* are divided into subspecies (and not to mention hybrids). However, the identification of taxa below species level would not be appropriate in a guide aimed primarily at beginners. Equally extensive is the treatment of the buckler ferns (in part 13) where differentiating characters are covered in detail, and particularly brave attempts are made to help us distinguish *Dryopteris expansa* from *D. dilatata*.

I particularly liked Part 14, "Ferns in winter", within which many photographs are shown of species at different points in the winter calendar to demonstrate that there need not be a closed season for "ferning"! A very helpful scale of 1-5 is used to signify the extent to which each species is deciduous or not. Other works have tended to mention whether a species is wholly deciduous, partly deciduous, or wintergreen (or some such phrases), but to my knowledge such a comprehensive treatment of the appearance of ferns in winter has not appeared before.

Although this guide is aimed primarily at beginners in fern identification (the more important messages being reinforced by repetition), there is much learning within for the more experienced. It treats the subject in ways that are not possible in book format, and in this respect succeeds well in being complementary to *The Fern Guide* and other British fern texts. I would recommend it to all for perusal and study, particularly on those dark winter evenings when you might even be tempted to go out "ferning" the following morning!

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RECORDING FERNS

part 3

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THE USE OF FERN PHOTOGRAPHY IN RECORDING CHANGE

We hear much about environmental change today, especially through the media. Television especially tends to repeatedly show photographs of pieces falling off icebergs, which actually happens all the time anyway. Instead, if we are to record the exactitudes of change more objectively and the detail of what is or is not actually changing and how, we must have a more precise way of doing it. Ferns provide one such quite exacting subject, and this is a subject which we are in an excellent position to interpret by recording accurately and sensitively. Further, experience of photographing ferns across diverse habitats and locations for half a century shows that use of a camera can be an enormously useful adjunct in providing a particularly accurate way of exactingly recording such change. So it is upon this aspect, that I want to encourage pteridologists to focus their cameras.

FERNS IN THE DIGITAL AGE

The digital camera has certainly revolutionised photography, both from the point-of-view of running-cost and the flexibility of what can then be done with images achieved. Such images have also improved yearly, to what I regard now as an acceptable level of quality in comparison with tried-and-tested film emulsions, and are likely to improve further in the direction of both quality and flexibility in future. Smaller digital cameras are also easy to carry, so are more likely to be to hand when needed (I speak with the conviction of one who has lugged heavy cameras, tripods and lens sets up tropical mountains in several continents for many decades). I especially appreciate the ability to be able to see instantly how faithfully your photograph reflects what is actually there in the field, and if it does not, to be able to repeat it, either right away (from a different light angle perhaps), or wait until conditions (e.g. light, wind, shadow) themselves naturally improve. Digital cameras also have the ability to produce images with good degrees of contrast and colour rendition, even in relatively low light levels that would challenge most film emulsions, so they really benefit pteridology.

WHERE ARE WE GOING?

Ferns are especially sensitive to both short- and long-term shifts in an array of climatic constraints, and this make them plants which are likely to become especially useful monitors of change (Page, 2006). This has also already applied to their past record (Page & McHaffie 1991; Page, 1987; 2001), and they thus have an important future role to fulfill, with implications that reach far beyond pteridology.

On the basis that 'the camera does not lie' (well, almost), pteridologists are in a good position to use this facility widely to observe and record change in considerable photographic detail. This can be supported especially by our ability to determine materials accurately and compare existing with known established ranges (Jermy *et al.*, 1978; Wardlaw & Leonard, 2005), and hence give observations made this way a significant degree of factual credibility. Cameras themselves can be a powerful tool in showing how habitats change since they have the natural ability to record considerable detail at one moment, which is then comparable in time. A sequence of two or more single-site photographs, taken at intervals, thus has the innate potential to record accurately how detail of a habitat, including species composition, may have changed over time. For it is a common experience to look back on older photographs and be surprised how much things have changed, in ways that might well have slipped our own memories. It is this ability that we need to utilise to more exactingly record change in ferns, and hence it is this photographic approach that I want to encourage pteridologists to aim to capture.

WHAT IS NEEDED?

What is needed are series of photographs which represent similar (mostly medium-distance) shots of fern habitats over time, which are repeated from as near the same position as possible. Such successive photos will show exactly what degree of change has actually taken place in the intervals adopted. The intervals chosen can themselves be brief (if it is suspected that change is happening rapidly), or repeated over gaps of a year or two or perhaps a decade or more, where change is maybe slower, and these photographic series are likely to be especially useful in the long-term. To do this, of course, it is necessary to be able to go back to the same location and photograph from as near the same vantage point as you can (having a particular fence-post or rock on which the set the camera helps a lot here). In attempting to take in the same view, I recommend using the same lens or its equivalent wherever possible.

As such photos are to become part of a series, do remember to date your photographs, and add the location. Newer digital cameras have the ability to impose the date automatically in the corner of the exposure, if required, and this is a facility which is certainly useful for this purpose, if

you have a camera that does this. [Alternatively, and to avoid spoiling your picture with data, you can refer to file properties where the date you took the picture and other useful information are recorded – ed.]

HOW CAN THE BPS HELP?

Such photography is something that almost anyone can do, and the advantage of suggesting this through the BPS is that the Society has many able members in multiple locations with access to multiple habitats over different periods of time. Thus between members, there is both diverse experience and a wide geographic spread of opportunity. Further, no one has to be a photographic genius. Quite straightforward photographs, such as most members can take (and may well be taking anyway) may well show change well, and as long as we know exactly where and when the photos were taken, they will almost certainly be useful. Even the apparently 'ordinary' habitat may show interesting and unexpected changes. And if they do not, then this is useful evidence too. As a valuable example, an excellent pair of photos by Heather McHaffie showing change in *Athyrium distentifolium* populations in Scotland, changing significantly over only a few years, was published recently in the *Pteridologist* (McHaffie, 2006).

Through the Society, I thus feel we have an opportunity to establish and develop this as a more co-ordinated programme. In the short-term, it is useful, of course, that members keep their own images closely to hand, for these will be valuable in re-locating the exact site for future shots, especially if the human memory fails. Further, if yearly or more intervals are chosen, then it is important to compare like with like, and so an ideal is to take shots which are repeated at as near the same time of year as possible, from the same place and the same angle. Indeed, many of us may find that we have already unwittingly started this process, by already having photos that we took some time ago, and can now go back and repeat. It may, therefore, be worthwhile going through your own existing photographs, and looking for those at sites for which it is possible to go back to, and start the programme rolling.

Digital images have the ability to be endlessly reproduced without loss, and so in the longer-term, I propose it would be use for such pairs or series of dated and located images to be accumulated more centrally within the Society. Should the Society agree, I volunteer to take the lead in establishing such a programme as one of the Society's onward purposes. This way, the whole project can continue long-term. Such activities could also be included on field meetings, if 'repeat' field meetings visited the same localities at intervals: these would be equivalent now and onward, to our earlier 'dot' recording programmes from which data the fern atlases were successfully compiled.

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PHOTO: JAMES MERRYWEATHER

Recording a population of *Ophioglossum vulgatum* on the Isle of Scalpay with a Canon *EOS* single lens reflex digital camera. Photograph taken with a Nikon *Coolpix* 3100 compact.

FERN STICKS

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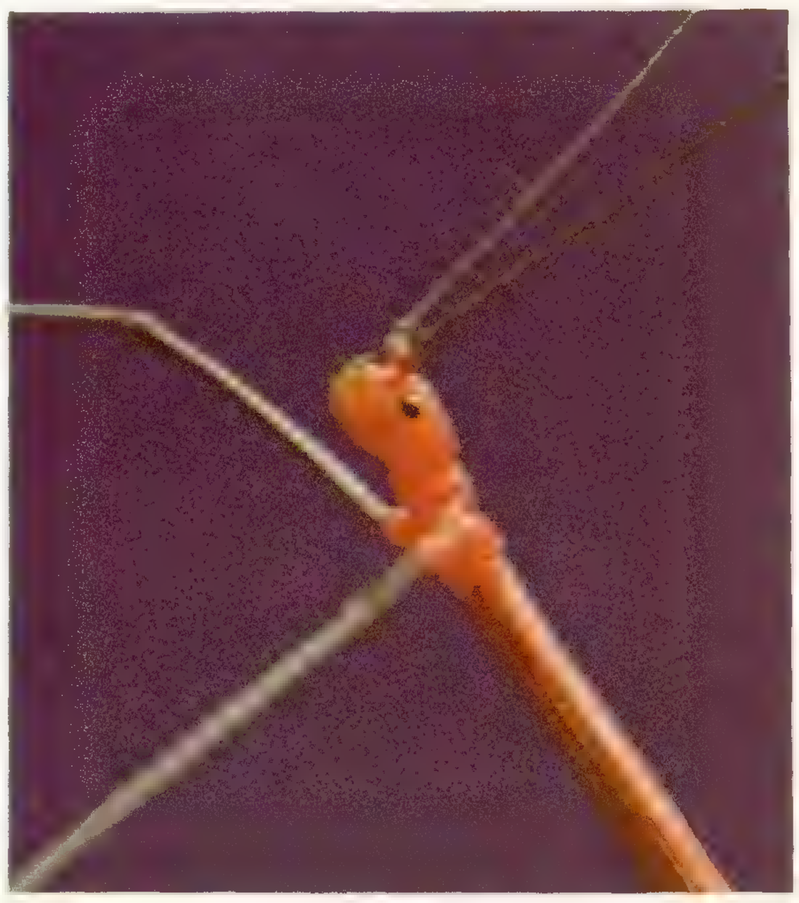
As fern enthusiasts you can be forgiven for never having heard about 'fern sticks'. You might be wondering if they are something similar to moss sticks that are used to support large house plants like *Monstera,* the cheese plant but they are nothing of the kind. They are in fact stick insects, or more correctly phasmids, which feed solely on ferns. Surprisingly there are very few species and of the 300 or so that are kept in culture only 2 of these naturally eat ferns. One species *Chondrostethus woodfordi* is everything you imagine a stick insect to be; it is brownish green and looks like a plant twig.

The other species *Oreophoetes peruana* is completely different and is much sought after by phasmid fanciers. Rather than depending on camouflage as a means of defence against predators it is brightly coloured; the female (above) is black and yellow and the male (left) is bright red. In nature these are warning colours which alert a potential predator to 'keep off' because the animal is protected in some way by having a sting or being unpleasant or poisonous to eat.



O. peruana has been much-studied because it is the only known animal which produces a chemical called quinoline which, when disturbed, the insect produces from a pair of glands on its thorax. Quite how it manufactures this complex chemical from its ferny diet is not very well understood. In its native Peru it is fairly short-lived and lives on the floor of tropical rainforests where it finds a wide range of ferns to eat. In captivity researchers usually rear it on *Nephrolepis exaltata* but in fact it will eat most ferns, even bracken!

Reference

Eisner T. *et al.* (1997). Defensive production of quinoline by a phasmid insect (*Oreophotes peruana*). *The Journal of Experiemental Biology* 200, 2493-2500.

Left: mating *Oreophoetes peruana* (female above).

Frederick Wilson Stansfield M.D., D.P.H., F.L.S. 1854-1937

The Stansfield Memorial Medal

A.R. Busby

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F.W. Stansfield was born at Todmorden, Lancashire where his family ran a well-known fern nursery. Although qualified in medicine and surgery, he was also an expert botanist and naturalist with a passion for ferns. A founding member of the Society, uniquely he served as President on three separate occasions, 1892-1897, 1902-1904, and 1907-1908.

It is as a fern grower, hunter and raiser of British fern varieties that he achieved a high reputation in British horticulture. His opinion and advice on all things ferny was most sought after and valued. He died on 28 February 1937. Such was the loss felt by all in the Society, it was felt that his memory should be perpetuated by the Society in a very tangible way.

A memorial to the memory of F.W. Stansfield was first suggested by the then President, W.R. Cranfield at the Committee Meeting on the 23 April 1937. The idea of a 'challenge cup' was dismissed because the Society had just presented a Silver Challenge Cup to Southport Borough Council to be awarded at Southport Flower Show for the

best group of ferns. A.J. MacSelf suggested that a better memorial would be a medal. This idea appealed to all present and the Secretary was directed to obtain estimates.

It was provisionally decided that the design of the medal should be as follows: On one side, the head of F.W. Stansfield surrounded by the words 'Stansfield Memorial Medal' and a representation of fern fronds. On the other side, 'British Pteridological Society', awarded to and date. It was agreed that the medal should be awarded at the discretion of the Committee "... to persons contributing to the advancement of the fern cult, whether by an outstanding exhibit, by raising an exceptional fine fern, by a scientific or cultural discovery or in any other way". A further mention in the same minutes: "The medal would be awarded by the Executive of the Society from time to time to an individual who had rendered exceptional service to the fern cult."

At the Annual Meeting held on the 19 July 1937, the Secretary gave an account of the enquiries he had made. As to the design and cost of the medal, it was felt that this was a matter which might best be dealt with by a small sub-committee.

At the 43rd Annual General Meeting held on the 18 July 1938, it was reported that the modeling for the die from a photograph presented real difficulties particularly when the section was produced other than in profile. A good deal of trouble had been taken to obtain a good result and before the model was passed, it was seen by his son Dr Tom Stansfield and Percy Greenfield.

A considerable sum had been subscribed towards the cost of the medal by officials of the Society and an appeal for contributions would be inserted in the *British Fern Gazette*. In October 1938, an estimate presented by John Pinches Ltd of London was accepted and £50 was paid on account.

Jimmy Dyce wrote, in a letter to Percy Greenfield dated 28 April 1967, "It might be as well if in awarding a medal it should be agreed that it should not be used for advertising purposes, as our Society deals more with the scientific side, e.g. Variation of forms rather than with their value in horticulture."

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The Stansfield Medal has been awarded nine times:

W.B. Cranfield, 1938; R. Bolton, 1948; P. Greenfield, 1952; Rev. E.A. Elliot, 1959; J.W. Dyce, 1975; R. Kaye, 1975; A.C. Jermy, 1991; A.R. Busby, 1998; M.H. Rickard, 2004

MANCHESTER HERBARIUM

The Leo Grindon Collection and Jesse Haywood's New Zealand Ferns

Barbara Porter

My interest began about ten years ago when I visited the Herbarium at Manchester University with my local Natural History group. We were all sitting around listening to the then curator, Sean Edwards, and I was admiring the white painted vaulted Victorian ceiling with the little balconies for quiet work spaces and said to myself, "Oh! I'd love to work here". But I must have said it out loud, because before I knew where I was Sean had stuck a list of jobs under my nose and asked if I fancied any of them. There in the middle was something about reviewing the ferns and dividing the European ones from the General ones to make two collections. I never stopped to think how little I actually knew about ferns; I had a reasonable knowledge of British ferns, a smattering of different European ones and nothing at all about world ones, except the few I grew in the garden and house. Anyway, I took on the job.

The Herbarium was founded in 1860 and is the fourth largest collection in the UK with around a million specimens. It is housed above the Museum, essentially in the attic. It consists of one large airy room with high windows and an enormous table in the middle surrounded by many shelves. Two very long corridors lead off which are stacked with shelves and cupboards on either side and have workspaces in the middle. These lead on to more rooms at the end, with odd nooks and crannies and yet more collections. There is an office for the assistant curator, more work spaces, a mezzanine and a spiral staircase in the corner that leads to the tower where there are four storage rooms. An upright ladder leads to a little room in the tower where you can get an incredible view of all the rooftops of Manchester and even to the Pennines, fifteen miles distant.

In the early days, before the refurbishment program, the specimens were wrapped in big plastic bags with the ends tucked under, not sealed in any way. These were housed in ancient cupboards whose doors wouldn't shut properly. Nowadays, we have pristine work surfaces, cupboards with properly shutting doors and dust-proof *Solander* boxes for storage. When I started, a lot of my work consisted of remounting specimens or cleaning them up. Luckily for me a proportion of them had been remounted though many were incredibly filthy, covered with over a century of Manchester city grime. I love remounting; there is much satisfaction in producing a clean presentable specimen, relabelled and ready for another hundred years. The relabelling was the real problem. At the beginning I didn't even know that names had changed over the years, e.g. that *Lastraea* and *Nephrodium* are now *Dryopteris*.

At that time there was a shortage of modern fern books in the Herbarium library. I did have the *Flora Europaea*; Volume 1 of *European Garden Flora* and Christensen's *Index Filicum* (1900) which is just a list of corrections of old names replaced with 1900 ones. This was very dilapidated and tied together with string. There were most of the British fern floras and various old Victorian volumes on ferns from different parts of the world, some with line drawings but mostly not illustrated. So at the beginning I was more of a refurbisher and tidier upper than a pteridologist. I often took my own books along, such as the *American Fern Grower's Manual* by Hoshizaki and Moran. Martin Rickard's *Plant Finder* was also a good friend. It took a while for it to dawn on me that the Herbarium could buy what I needed and sure enough all the ones I asked for were bought. So, bit-by-bit, I began to learn.

After the refurbishment we kept finding odd boxes of ferns up in the tower rooms, on the mezzanine or even just piled up on the floor, and I'd come in to find yet another odd box on my desk. Sometimes the fronds were not mounted at all, just loosely wrapped in tissue paper accompanied by scraps of paper with odd bits of information

about the specimen. It turned out that some of this material belonged to the Leo Grindon collection which, it is estimated, consists of 39,000 specimens.

Leopold Hartley Grindon (1818-1904) was born in Bristol but came to Manchester in 1838 where he lived for the rest of his life. He worked as a cashier at Whittaker's Spinners but in his spare time was a great collector and botanist. He later ended up lecturing in botany at the Royal Manchester Medical School. He wrote many books on Natural History, e.g. *A Manchester Flora* (1859); *The Trees of Old England* (1870); *The Shakespeare Flora* (1883); *Grindon's Pathway to Botany* (1872); *Country Rambles* and *Manchester Walks and Wild Flowers* (1882). He made a vast collection of dried specimens of any plants he could get hold of from his many contacts worldwide and this was donated to the Herbarium, by his wife, in 1910.

When he started (at the age of thirteen) he collected for his own interest, but later Grindon the philanthropist used them to make the lives of Victorian factory workers from the slums of Ancoats or Gorton a little less bleak by showing them the flowers and vegetables they could grow in their little back yards. I think he got carried away and collected anything and everything, including weeds. There were exotic ferns like *Cyathea*; groundnut (*Arachis hypogaea*); breadfruit (*Artocarpus artilis*) one leaf of which covers an entire folio page; coffee (*Coffea arabica*) and other unlikely denizens of a Manchester back yard. To start with he mounted specimens on small pieces of paper, but he soon began using 19" x 12" paper and was mounting each specimen very carefully, making slits on each side of the stem with a penknife and fastening glued strips through to the back of the paper. Many of these original specimens still survive with their labels in his distinctive handwriting. Later he gave up mounting and kept them in loose sheets of tissue paper so that it was easier for his classes to see them.

To complement his herbarium specimens he added illustrations (around 15,000), articles from contemporary gardening magazines and correspondence from fellow botanists. He bought two copies of each magazine, so his pupils would not have to turn the pages. He acquired tattered copies of old herbals like John Parkinson's *Theatricum Botanicum* (1640) or *De Historia Stirpium* (1542) by Leonhart Fuchs. In fact he used dozens of different sources. Grindon's collection now occupies 24 cupboards in the Herbarium from floor to ceiling. It also includes five cupboards containing a comprehensive fern collection, which complements the British, European and other world ferns in the Herbarium. Grindon founded the Manchester Field Naturalists' Society, but was blackballed from the Literary and Philosophical Society because he allowed women to join amid scurrilous stories about what the 'botanicals' got up to in the field.

I 'got to know' some of the other collectors quite well too. They were so individual in their way of working. For instance there was a lady called Jessie Heywood, who collected ferns in New Zealand around 1900 whose specimens were so beautifully displayed and so fresh looking that her work is instantly recognisable. I don't know how she did it, but many of her specimens are still as green as in life and had not turned brown as most do. She mounted them, not using narrow strips of paper as we do, but by punching tiny holes in the paper on either side of the stipe or pinna and very carefully tying them down at the back with cotton. New Zealand collectors on the whole were very concerned with appearance and many of them seemed to collect them to sell, decorated with bits of moss and small pinnae from other ferns to make a pleasing picture (below). In fact in one collection there was a brochure with a list of what was available for sale.

Many thanks to Yvonne Golding who encouraged me to write this article and who took the photos.

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For more information about the Manchester Herbarium or to arrange a visit, please contact the curator of Botany Leander Wolstenholme: leander.wolstenholme@manchester.ac.uk or visit the website: www.museum.manchester.ac.uk

WHAT'S DUTCH ABOUT DUTCH RUSH?

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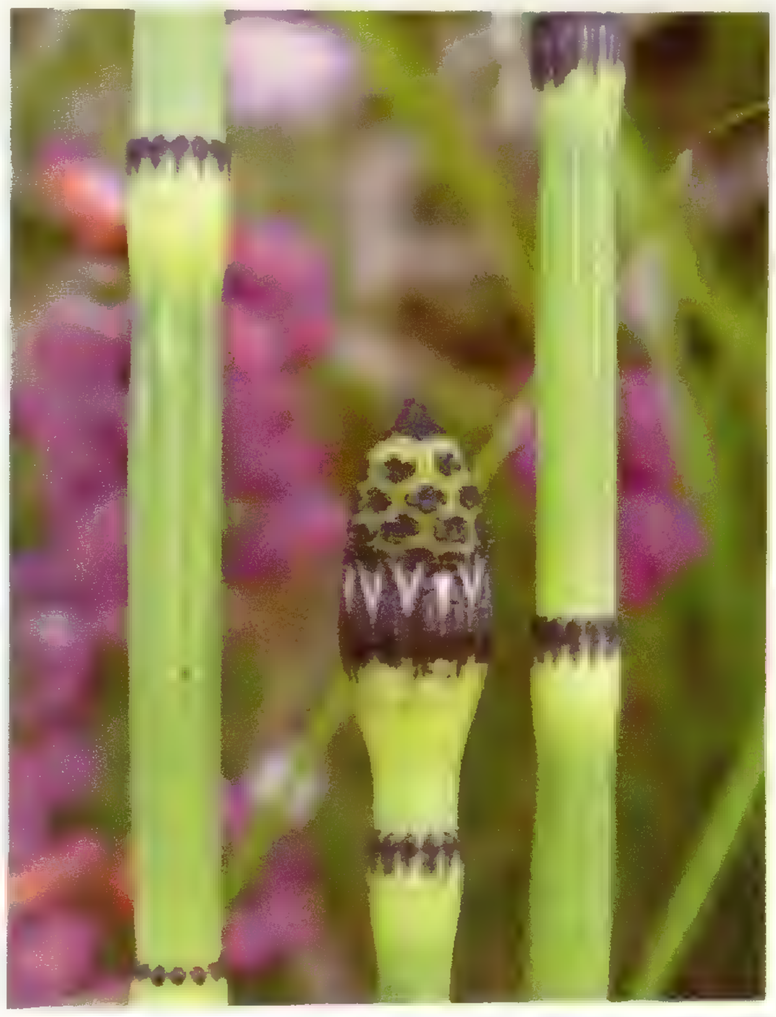
The vernacular name of the horsetail *Equisetum hyemale* L., Dutch Rush (fig. 1), is attributed to imports from Holland in the first half of the 19th century. From our present research it appears that this species is not at all a common one in the Netherlands, for the majority of its recorded localities in this country are to be ascribed to the hybrid *E. moorei* Newman (fig 2.). Especially in the coastal dunes of Holland in the narrow sense, *E.* x *moorei* is a common inhabitant of areas with shifting sand. Originally wondering if the present distribution of this hybrid would be essentially anthropogenic, for sand binding is cited as one of the qualities of *E. hyemale s.l.*, the question also arose as to whether the name Dutch Rush originally applied to the hybrid rather than its parent. For wouldn't it be likely that a horsetail fairly common near the centres of population in the west would have been used as an export crop rather than a quite rare species hidden in the forests of the far less developed east of the country?

Newman (1844, first edition 1840, not seen) wrote about Dutch exports to London (p. 21):

"For this purpose it is imported, under the name of 'Dutch Rush', in large quantities, from Holland, where it is grown on the banks of canals and on the sea ramparts, which are often bound together and consolidated by its strong and matted roots. I find however that a doubt exists with some excellent botanists, as to whether the Dutch Rush cultivated in Holland is identical with either of our British species. Mr. Shepherd, the curator of the Liverpool Botanic Garden, having this plant in cultivation, has most kindly supplied me with specimens in a recent state. These are of much larger size than any British examples of *E. hyemale* I have yet seen, and present structural characters different from those of the British plants. The most obvious is the much greater number of striae, amounting in some instances to



Dutch rush *Equisetum hyemale*

thirty-two." About the British specimens, he adds (p. 22) "... the striae are usually about twenty in luxuriant stems, but this number is liable to considerable variation, and depend entirely on the size of the stem, always decreasing towards its attenuated apex."

He doesn't mention the average height of the British plants known to him, but from his illustration it may be concluded that a stem of "fine, but not extraordinary growth" measured about 60 cm.

In addition, Moore (1861, p. 175-176) elaborates on its use as sand binding agent: "They are obtained from Holland, where this species is planted to support embankments, which it does by means of its branching underground stems. It has been suggested that our own sandy sea-coasts might be profitably planted with it ... All the species of *Equisetum* have a flinty coating to their stems, and may be, and are, more or less employed in polishing; but the stems of *E. hyemale* are much preferable to those of other kinds, in consequence of their rougher and more hardened surface."

Moore knew *E.* x *moorei* at that time, for this hybrid is treated in its own section immediately following this citation. It might, however, have been too rare at the time to be considered as an alternative to *E. hyemale* for polishing, and therefore not to be included in his general statement about *E. hyemale* being preferred above other species.

A similar account on *E. hyemale* is given by Pratt (1866, p. 287-288): "This is not a common species, and is apparently very local in those countries in which it occurs ... It is common in many moist lands and woods in some continental countries, as in Germany and Switzerland. In Holland it grows in plenty, and attains great luxuriance on the numerous embankments and sides of canals; and the large quantity of the plants brought annually to the London market has led many botanists to think that its culture along our sandy coasts would be of value in a commercial point of view, and at the same time it would form a firm soil at the margin of the waters. Mr. Francis, who observes that on such places it would grow rapidly and luxuriantly, and would yield a considerable profit, adds: "The Dutch are well acquainted with the value of its long and matted roots in restraining the wasting effects of the ocean, which would soon undermine their dykes, were it not for the *Equisetum hyemale* which is planted upon them.""

It is noteworthy that both these contemporaries of Newman assign a height of two to three feet to *E. hyemale*, from which follows that the Dutch rushes that impressed Newman must have been over one

Figure 1. ***Equistum hyemale*** **L. Left to right: strobilus; sheath from the middle part of the stem; sheath from the basal part of the stem.**

meter in length. This doesn't agree well with our observations today, where variation exists between the various populations, possibly due to their degree of shelter, ranging from ca. 45 cm to double that size, and even to 120 cm in one exceedingly luxuriant population. Even more difficult to reconcile are Newmans details about the stem diameter. The number of 32 ridges not only exceeds any specimen seen in the Netherlands to the same extent as those from Britain, it's also well beyond the range of the European *E. hyemale* subsp. *hyemale* (14-26 ridges). It rather suggests *E. hyemale* subsp. *affine* (Engelm.) from North America, which has 14-50 ridges and grows taller and thicker (Hauke, 1963). Since 1945 the site of the Liverpool Botanic Garden, where Newman got his specimen from, was no longer used for its original purpose so the possibility that the plant remains in cultivation and can be traced back is remote (J. Edmondson, pers. com.). There is, however, a voucher by John Shepherd (accession number 1909.LBG.9562) of "*Equisetum hyemale*" cultivated in Liverpool Botanic Garden, Myrtle St, and preserved in November 1816. This gathering is a mix of *E. hyemale* and *E. variegatum*, the former being a rather small plant (*ca.* 55 cm as estimated from the scan kindly provided by Mr Edmondson) with about 15 ribs. Since Newman writes about "*Mr. Shepherd, the curator of the Liverpool Botanic Garden*", whereas John Shepherd had deceased in 1836, he presumably meant Henry Shepherd, the second curator of the Garden, which of course does not preclude that the plant has been in the Garden as early as 1816. The mixing of two species on the voucher, however, casts some doubt on how well horsetails from different origins were kept separated. Specimens from London markets in the first half of the 19th century might be found in other herbaria though, but so far none have been found.

In the Netherlands too, *E. hyemale s.l.* was "very commonly used by woodcraftsmen and all kind of artisans who were to give shine and polish to various bodies" (Kops, 1846). Since these horsetails can suffer from too much harvesting, a considerable area must have been planted to support both domestic and export markets. It makes one wonder where this could have been since large populations of *E. hyemale s.s.* are not found today and was it was not very widespread in the early nineteenth century. Kops (*loc. cit.*) does say that in some places it is found in abundance. He is, however, not specific as to which of his localities this applies. From his enumeration of localities as well as from his illustration it is apparent that he includes in this species the large *E.* x *moorei* populations in the dunes of the south of Holland. Both Newman and Pratt mention the sides of canals where it would have been grown. At present we have yet found but one location on the bank of a canal (Overijsselsch Kanaal, constructed in 1858). At first sight it doesn't seem a very plausible reference, for the species typically grows on sandy soil and most canals on those grounds weren't constructed until the onset of the industrial revolution in the eastern parts of the country later in the 19th century.

Figure 2. ***E.*** **x** ***moorei*** **Newman. Left to right: strobilus; sheath from the middle part of the stem; sheath from the basal part of the stem.**

More confusing is the reported use to reinforce sea-ramparts. Although this would be a perfect explanation for the abundance of the hybrid between Scheveningen and Hoek van Holland, Kops (1798; pp 115-116), after a thorough study of the North and South Holland dunes, very explicitly states that no other means are known to him to fix the dunes than marram (*Ammophila arenaria* (L.) Link), straw, and reed mats. He was a botanist as well as knowledgeable in agriculture and in this study he paid special attention to the problem of shifting sand. If *E.* × *moorei* had been in use to fix shifting dunes he certainly would have noticed it and even more so, if it had been an important product collected from the dunes.

Nevertheless, the hybrid in its dune localities is bound to areas with moving sand and has been observed to disappear within twenty-five years once the sand is fixed and the vegetation closes. I therefore assume, that either it was deliberately planted in later years, maybe even prompted by the suggestion in British literature as cited above, or its distribution is natural and it had at the time not yet been recognised as a sand fixator.

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A Case for *Ex-Situ* Conservation?

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Matt Busby's article on *Dicksonia* × *lathamii* (*D. antarctica* × *D. arborescens*) on page 179 makes it timely to raise questions about the future of one of the parent species of tree fern that gave rise to the hybrid. We don't need to spend time on *D. antarctica*, because of its familiarity in gardens and plant centres (as well as in its native Australia!). But what about the other putative parent, *D. arborescens*, the St Helena tree-fern, and type species of the genus *Dicksonia*?

***D. arborescens* under glass at RGBE in April 2007, showing its very long, slender, orange-brown stipes.**

D. arborescens in the wild

The species is endemic to the tiny (10 x 17 km; 122 square km), isolated and mountainous island of St Helena. This place, famous for the final exile of Napoleon Bonaparte, is still relatively inaccessible, having no airport and only reachable by ship.

St Helena rose volcanically out of the Atlantic Ocean, at latitude 16°S, about 14 million years ago. The nearest continent is Africa (with no *Dicksonia* species), 2000 km to the east. South America is 2900 km to the west and has *D. sellowiana*. Even on St Helena, the tree-fern habitat is very restricted. They grow only in what are described as 'thickets', where they are quite abundant, near the summit ridge of the extinct volcano. This is at altitudes of 700-823m, where clouds deliver moisture. Near sea level, the tree ferns do not grow naturally. Nor, apparently, are they cultivated in Jamestown, the centre of habitation. A picture of the tree ferns in their native surroundings may be found at: www.sthelena.se/tour/dpeaksw.jpg

D. arborescens under glass

Today *D. arborescens* is very rare in cultivation. Among 800 botanic gardens in over 120 countries, there is only one listing of this species (presumably Edinburgh) on the website of Botanic Gardens Conservation International (www.bgci.org). This website records botanic-garden holdings of 11 other *Dicksonia* species.

Among the few places in Britain where *D. arborescens* may be seen today is the Tree-Fern House at the Royal Botanic Garden Edinburgh (RBGE). That specimen, illustrated here, was grown from spores that were wild-collected on St Helena and propagated at RBGE by Andrew Ensoll. A generous donation of this rarity was recently made to the Kibble Palace in Glasgow, as reported in adjacent pages. Neither the Edinburgh nor Glasgow plants had trunks or developed fertile fronds in April, 2007. The frond stipes pictured opposite are long, thin and twisting, quite unlike the short, robust stipes of *D. antarctica*. Nor do they correspond to the description 'the stipe is dark and stout' in Large & Braggins (2004) monograph *Tree Ferns*.

In 2003, I too was the grateful recipient of a *D. arborescens* from RBGE. As a potted plant, it spent the summers of 2004 and 2005 outside, and the winters in a cool glasshouse kept above 3°C. In the autumn of 2006 I made the rash decision to plant it in the ground of a large walk-in cold-frame. Here in February 2007, the air temperature went down to -3.5°C. Soon thereafter, the hitherto green fronds of *D. arborescens* started to go brown and eventually withered completely. Now in June 2007, the plant seems to be dead.

In reacting so badly to modest frost, the *D. arborescens* showed itself to be less frost-hardy than adjacent ferns in the same enclosure, and which kept their fronds green during that winter and put out new growth in 2007. These included: *Dicksonia berteroana*, *Dicksonia sellowiana*, *Asplenium flaccidum*, *Asplenium marinum*, *Blechnum colensoi*, *Histiopteris incisa*, *Pellaea rotundifolia* and *Pteris cretica*.

I may of course be wrong in blaming frost for killing my *D. arborescens*. It could be that the soil got too dry. Being a microbiologist, I think also about infectious diseases. I wonder, for example, if the critical injurious action on my part was exposing the roots of my plant to possibly hostile microbes in the unsterilized soil of my cold frame? Were Scottish microbes too aggressive for an alien, long-accustomed to the humus on Diana's Peak? Previously, my plant had been in artificial bark-based compost made at RBGE and probably relatively free from plant pathogens.

Whatever the explanation, my *D. arborescens* did not survive cold, and possibly dryness, exposures that were non-injurious to two other *Dicksonia* species of about the same size. It would therefore seem that *D. arborescens* should be treated as frost-tender, despite Large & Braggins's opinion that it "will endure light frost." On the other hand my experience agrees with their "does not do well if transplanted."

Top portion of blade of *D. arborescens*, under glass in the Kibble Palace at Glasgow Botanic Gardens. The Plant had been donated by RGBE.

Does *D. arborescens* need special growth conditions?

Suspicion that *D. arborescens* is difficult to propagate and maintain comes from several sources.

It has not been kept going in major collections, such as Kew. Even in Birmingham Botanic Gardens where the hybrid has existed since 1885, the *D. arborescens* parent has long since disappeared.

According to Latham's 1885 account (see Matt Busby's article) he sowed separate pots with spores of the two species and "In due time the prothallia came up very freely in the pot of *D. antarctica* but not in the case of *D. arborescens*." Latham is not fully explicit, but gives the impression that *no* prothalli appeared in the pot sown with *D. arborescens* spores, while two atypical prothalli appeared among abundant different-looking prothalli in the *D. antarctica* pot. He subsequently watched these atypicals developing sporophytes and potted them on, believing them to be *D. arborescens*. It was only later, when the plants had matured, that he saw that their morphology combined features of the two *Dicksonia* species and concluded that he had made a hybrid.

It does seem therefore that the *D. arborescens* spores did not germinate and grow in their own pot, but only as cross-contaminants when surrounded by *D. antarctica* prothalli. Can one conclude that the hybrid arose with *D. antarctica* as the male parent, since the sporelings that eventually were identified as hybrids, developed from prothalli (and therefore in archegonia) of *D. arborescens* as the female parent?

Finally, Andrew Ensoll at RBGE told me that the wild-collected spores from which he grew the *D. arborescens* pictured here, were 'difficult to grow'.

Future of *D. arborescens*

The St Helena tree fern is not officially considered a threatened species in the *IUCN Red List 2006*. However, with its extremely restricted habitat on a single tiny island, its future survival could be problematic. One of the St Helena websites describes it as "under constant threat from invasive weeds." Even without the threat of climate change – and who can ignore that these days – *D. arborescens* would seem to be a good candidate for *ex situ* conservation. That would have the desirable effects of insuring against possible depletion or disappearance in the wild, and making available for scientific study and aesthetic enjoyment the type species of the genus *Dicksonia*.

A recent model of *ex situ* conservation was provided by the Wollemi Pine (*Wollemia nobilis*), unexpectedly discovered in 1994 as a small grove of trees in a remote canyon in Eastern Australia. The authorities there took the strategic decision to have a two-pronged approach to conservation: preserving the wild habitat (by restricting access), and mass-propagating and distributing small plants of *Wollemia nobilis* worldwide. Long before *Wollemia*, the Gingko and the Dawn Redwood were already widespread in horticulture, whereas their wild habitats had essentially disappeared.

D. arborescens would be unlikely to achieve the mass appeal of *Wollemia*, because of its apparent frost-tenderness, likely difficulty of growing from spores and stated dislike of transplanting. Also, being slow-growing, it probably takes many years to develop a distinctive trunk, until when it looks to the untutored eye like an ordinary 'ground' fern without particular architectural merit. However, I am sure it would have specialist interest for fern enthusiasts and would find a place in many botanic-garden glasshouses. I propose therefore to investigate how *Wollemi*-type conservation actions might be applied to the St Helena tree fern.

IN THE GARDEN

THE 'ACUTILOBUM' SAGA

Robert Sykes

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When Martin Rickard and I were editing Jimmy Dyce's manuscript '*Polystichum Cultivars*', one of the major tasks was to provide all the illustrations. We managed most of them but lacked *Polystichum setiferum* 'Acutilobum Allchin', and were – indeed still are – not sure what it looks like.

I will return to Allchin, but will first explore the chequered history of acutilobes generally. In 1852 the great fern-hunter G. B. Wollaston went for a walk near Ottery St. Mary in Devon with the Rev. William Gardiner. Round a bend in the lane they came upon a magnificent fern: the picture of it (Fig. 1) is taken from the appendix to Druery's *British Ferns and their Varieties* [1910], and is a reduced copy of one of Col. Jones's Nature Prints (1876-1880). It is accompanied by an extensive note, which was written by Jones. Wollaston called the fern 'Proliferum' because it had bulbils, unfamiliar at the time. It later transpired that lots of cultivars had bulbils, so the name was no longer appropriate. "The variations of character among these finely-cut varieties are now known to be so great," says Jones, "that they can no longer be mingled together without considerable confusion of ideas."

Fig. 1. The fern found by Wollaston and Gardiner in 1852, originally called 'Proliferum Wollaston', then 'Acultilobum proliferum Wollaston'.

Wollaston proposed a division into three classes, Multilobum, which we can leave for another day, Acutilobum and Divisilobum, which he defined:

> 'Acutilobum', tripinnate, - all the divisions of the frond acute, the anterior and posterior pinnules nearly of the same length.
>
> 'Divisilobum', tripinnate, - the same as 'Acutilobum', except that the anterior and posterior pinnules are of unequal lengths, the latter far longer and the divisions altogether more highly developed – a well-grown plant is sub-quadripinnate, or even quadripinnate.

That was not the end of it: Padley took Wollaston's proposal and extended it: there is an air of work in progress about the discussion. All that (and there is a lot more) is taken from Jones' note quoted in the appendix to Druery's book (p. 414). In his text Druery does not attempt to resolve it. He was enthralled by varieties, but I suspect that, unlike Lowe, he was not very interested in classification. He remarks merely that, "The term 'Acutilobum' has been substituted for 'Proliferum', so many other forms bearing bulbils". He offers the description, "The pinnules are long and slender, and very acutely pointed, and the varieties are generally proliferous," and an illustration of an Acutilobum (Fig. 2). Its posterior pinnules are longer than its anterior pinnules, so why is it not a Divisilobum? Because, perhaps, he took the picture from E. J. Lowe's *Our Native Ferns* published in 1867, before the Nature Prints and the discussion quoted above were published; or possibly because he did not accept the distinction proposed. In any event he did not attempt to address, much less resolve (or perhaps even notice) the confusion which had arisen.

Dyce addressed the problem in an article in the BPS *Bulletin* Vol. 2, No. 4 (1982) page 200. He cuts through Wollaston's proposed distinction between Acutilobum and Divisilobum:

> "BUT – what about the marginal plants where it would be very difficult to decide which were the longer, and what about the habitat and the changing growing conditions year by year which could influence pinnule growth one way or the other?! Some plants could be acutilobes one year and divisilobes the next!
>
> "It is time to change all this – plants with *undivided* pinnules as described here are in the *Acutilobum* section, and

Fig. 2. The illustration in Druery's *British Ferns* (1910). He adopted it, apparently uncritically, from Lowe's *Our Native Ferns* (1867). The basal pinnules are longer, so Wollaston, according to his proposed division, would have called it a 'Divisilobum'.

Fig. 3. *Polystichum setiferum* 'Acutilobum Wollaston', one of Jones Nature Prints, but unlike Fig. 1 (also Jones), it is an 'Acutilobum' within Dyce's understanding of the term.

all plants with divided pinnules, provided they conform to the requirements of the section, are in the *Divisilobum* section."

Of Wollaston's Proliferum/ Acutilobum he says that it is very much a Divisilobe. "In fact, it is regarded as the typical variety for the cultivar group".

Forget about Wollaston's plant then. But what then is an acutilobe? In his article Dyce described it thus:

"This is a very simple variation but very much one of the "blue-blooded" elite in soft shield fern variation. The pinnules are very narrowly triangular, running out to sharp points and, except for the basal lobe, are not divided in any way – some of the varieties, however, may have finely pointed serrations. The basal lobe, rather like the thumb of a mitten in the normal form, has a similar narrow shape but is smaller and juts out at a wide angle to the pinnule axis. The texture of the whole frond is hard and it is glossy in appearance. Many of course are not so clean cut and distinctive, but as long as the pinnules are entire, hard in texture and glossy, they can be regarded as *Acutilobum*. There are few really good ones around."

Bipinnate then. What is extraordinary about this description is that it is totally different from the tripinnate Acutilobum defined by Wollaston in Jones' note and different too from Druery. So where did Dyce get his version from? I could not believe that he would simply have pulled it off the wall, but if not where did it come from?

I know of two illustrations that support his thesis. The first is one of the Jones Nature Prints (Fig. 3). Incredibly it was raised by Wollaston (he of the tripinnate definition) in 1873 and named *P. angulare* (the then name for *setiferum*) 'Acutilobum Wollaston'. So Jones in the Nature Prints (1876-1880) illustrated the bipinnate Acutilobum Wollaston, but also included Wollaston's original 1852 tripinnate Proliferum as Acutilobum-proliferum, and set out the discussion which I have summarised above, which was repeated without comment by Druery in 1910, successfully confusing the cognoscenti at least up to Dyce's article in 1982. And beyond – I for one still thought an Acutilobum was nearer to Wollaston's original idea than Dyce's when I embarked on editing his book. Martin Rickard soon put me right. One of the best illustrations of an Acutilobum incidentally is on the cover of his book *The Plantfinder's Guide to Garden Ferns* (2000).

The second illustration is in the first volume of Thomas Moore's *Nature-Printed British Ferns*, 1859 (Fig. 4.). I was delighted to discover there an Acutilobum, which appears to fit Dyce's definition. Moore called it "*Polystichum angulare* var. proliferum Wollastoni" (though it does not resemble the 1852 find of that name). There is an odd visual ambiguity: the frond is bipinnate with a single lobe on the pinnule; the other smaller element appears to be a pinna off a much larger frond, which could conceivably be the 1852 plant (Fig. 1), but does not look

Fig. 4. Plate XXIII in Thomas Moore's *Nature Printed British Ferns*. It is called *Polystichum angulare* var. proliferum Wollastoni. It should be the same as the fern in Fig. 1. The pinnule could be that, though it is not feathery enough. The frond, however, is quite different and fits Dyce's concept of the bipinnate acutilobum.

fine enough. If it is a pinna, the frond is tripinnate and there is no lobe. And yet they appear over the one caption. They do not appear to come off the same fern. It is unsurprising that very different notions of Proliferum/Acutilobum prevailed well into the 20th century.

We are not limited by the ferns Moore chose to print. His herbarium was bought by Kew in 1887. It is a wonderful resource. The dated *Polystichum* specimens are mostly in the 1850s through to the early '70s. The familiar fern hunters and breeders of the period are all represented. Sadly most of the ferns (like their owners) are long since extinct, but the types are still with us. Peter Edwards, the curator, helped Martin and me hugely by supplying photocopies. One might suppose that one has merely to inspect the herbarium to resolve all doubts. Hmmm… Among the *P. setiferum* fronds there are:

- 33 fronds called 'Acutilobum': they include some which we would now classify unhesitatingly as divisilobes, some whose lobes are not remotely acute, which we (and Jones – see above) would call multilobes and some which are superb acutilobes in Dyce's bipinnate sense.
- 4 fronds called 'Acutilobum proliferum' of which 3 are bipinnate Acutilobums, and 1 is Wollaston's divisilobe of 1852.
- 1 frond called 'Acutum' marked 'Stansfield': it is one of the best Acutilobes, with long falcate pinnules and no serrations.
- 1 frond called 'Proliferum'. It tends towards Acutilobum in the bipinnate sense, but the pinnules are too wide and the lobes are undistinguished.

In addition, among the *P. aculeatum* fronds are 3 called 'Proliferum'. One is very similar to the *P. setiferum* 'Proliferum' above. The other 2 are bipinnate acutilobes. One excitingly is called 'Dr Allchin's seedling' (Fig. 5). 'Acutilobum Allchin' was a wild find in 1853, so it looks as though this frond is not it. It is unfortunately undated. It is a fine bipinnate Acutilobe, remarkably similar to a fern of Wollaston's dated 1864.

Back to Allchin. Dyce writes of Allchin's fern:

"It is described as growing to a medium height, with rather spreading fronds, which are densely covered with small red-brown scales in their early stages. The pinnules are very narrow. Very many years ago I found a plant conforming to this description in the old Lakeland garden of J. Wiper, a founder member of our Society in 1891. His ferns have been retained by all subsequent owners and the acutilobe variety must have been there for 100 years at least. There seems to be no doubt that it was part of Allchin's find since this was the only time it was ever found."

Fig. 5. A frond from Thomas Moore's herbarium. He called it *P. acul. proliferum W.* Someone has noted on it 'surely angulare' (I agree) and 'Dr Allchin's Seedling'. That suggests to me, disappointingly, that it was raised by Allchin, rather than found in the wild.

The Wiper garden in Kendal changed hands recently, so it seemed a particularly good moment to make myself known to the new owner and ask permission to look for Allchin. I found a large and beautiful acutilobe fern (Fig. 6), but is it Allchin? It certainly has many red-brown scales, though I saw it in early October, but the pinnules are not exceptionally narrow. Dyce says Allchin's find was unique, but Lowe (see the next paragraph) disagreed. In the absence of some other evidence, I fear Dyce's identification must be taken to be speculative.

I sent frond scans to Martin Rickard to see if he could resolve the uncertainty. He too was unable to say whether the plant from the Wiper garden is true Allchin. He drew my attention to the entries in E. J Lowe's *British Ferns and Where Found* (1890) (my copy from which the quotations below are taken is 1891). Under *Polystichum aculeatum* (remember Allchin was thought to be aculeatum at that time) he says:

"Proliferum, *Wollaston* (acutilobum, *Jones*). Found in 1853 by Dr. Allchin. 36 x 6 inches. In 1873 the late Mr. John Wills found a very similar plant in Dorset. Not unlike a proliferum (or acutilobum) in Aspidium angulare [now *P. setiferum*], but longer and more lax."

What does he mean by that last sentence? As his own book demonstrates, there is a huge range of 'proliferum/acutilobum' forms in *P. setiferum*, many of which (notably Wollaston's 1852 find) do not in the least resemble *P. aculeatum*.

Under *P. setiferum*, Lowe adopts Wollaston's proposed distinction between 'Divisilobum' and 'Acuti-

lobum', so 'Acutilobum' is 'Pinnules acute-lobed, upper and lower ones of equal length'. He lists 25 varieties. The descriptions are scant, but they include some which are not remotely like Dyce's idea of the form (eg. Wollaston's Proliferum, whose pinnules are not of equal length anyway, and 'laciniare….A lovely lace-like form'), and some which appear to fit.

So where does all that leave us? I keep finding new material, and I am sure I have missed some. In particular, I have not yet been to see Padley's herbarium at Wisley, but this article is too long already, and a pattern is emerging. Our forebears were trying to give descriptive names to their finds:

'Proliferum' fell out of favour: Druery under 'Acutilobum' in *British Ferns and their Varieties* says, "The term "acutilobum" has been substituted for "*proliferum*" so many other forms bearing bulbils"; but then inconsistently under 'Proliferum' he says: "This constitutes a section in which the subdivisions are very narrow and acutely pointed, for which reason it is also termed *acutilobum"*, and illustrates four handsome and, to my eye at least, disparate forms.

'Divisilobum' the pinnules are divided into numerous pinnulets, the final segments very narrow, long and pointed. The proposal to split it into forms with similar length pinnules, and forms with longer basal pinnules, was last expressed by Lowe in 1890. I think it may be taken as abandoned. Having said that, there is a huge range of ferns within the Divisilobe Group description, and some division would be helpful.

'Acutilobum' this was the name suggested for the forms with similar length pinnules, but, as the Moore herbarium shows, far too many forms were included in the name to provide a coherent group. Dyce's solution was to include all forms complying with the 'Divisilobum' description in the Divisilobum Group, regardless of pinnule length. He reserves the name 'Acutilobum' for the very different form shown for example in Figs. 6 & 7. That decision is pretty arbitrary, but it has the merit of clarity. He describes Acutilobum in *Polystichum Cultivars* as "pinnules undivided or sharply serrate, very pointed; basal lobes reduced to a sharp tooth; texture hard, glossy".

The Acutilobum story illustrates the 19th Century approach to fern naming. Every cultivar got a name. Many dissimilar cultivars got the same name, partly no doubt because several of the senior experts of the day were giving the names with only informal co-ordination. There was a robust readiness to change a name if they felt they had got it wrong. Our Society was formed in 1891 with the express intention of bringing some order to the jungle. It was perhaps a missed opportunity that Druery's *Book of British Ferns* [1903], written for the Society, reviews the best forms, but makes no attempt at classification.

I fear we still do not know what *P. setiferum* 'Acutilobum Allchin' looks like. It may be the splendid plant in the old Wiper garden, but Dyce's description is too general and the authorities too confused to identify it with any certainty. I do not know where Dyce derived his description. He may have got it from his great friend Greenfield, who was son in law of Dr F. W. Stansfield. Or maybe there is a description somewhere, a picture even; that would enable us to pin it down.

So what? Does it matter? There are a few Acutilobums around. According to Dyce, Allchin is the only surviving named variety. If we cannot now identify Allchin, that leaves none. Of course a plant is just as beautiful with or without a name, but I for one get a special thrill from knowing that a plant was originally found or bred by one of the old collectors. There are not many of which that can be said. But the most important thing is that, thanks to Jimmy Dyce, it is now clear what an Acutilobum is (Figs. 6 & 7 if you are still wondering), and the unfortunate confusion with Divisilobum is resolved.

A final plea: is there anyone out there who has a genuine, vouched example of *P. setiferum* 'Allchin' in his or her garden? Or can anyone put a hand on a definitive description or picture which would enable us to identify the plants we have?

Fig. 6. Collected in the garden of J. Wiper, this plant has probably been at its present site for 100 years. It is clearly an acutilobe. It is hard and glossy (but not as much as *P. aculeatum*), and has the aculeatum characteristic acute angle at the pinnule base. It is, however, *P. setiferum*. But is it 'Acutilobum Allchin'?

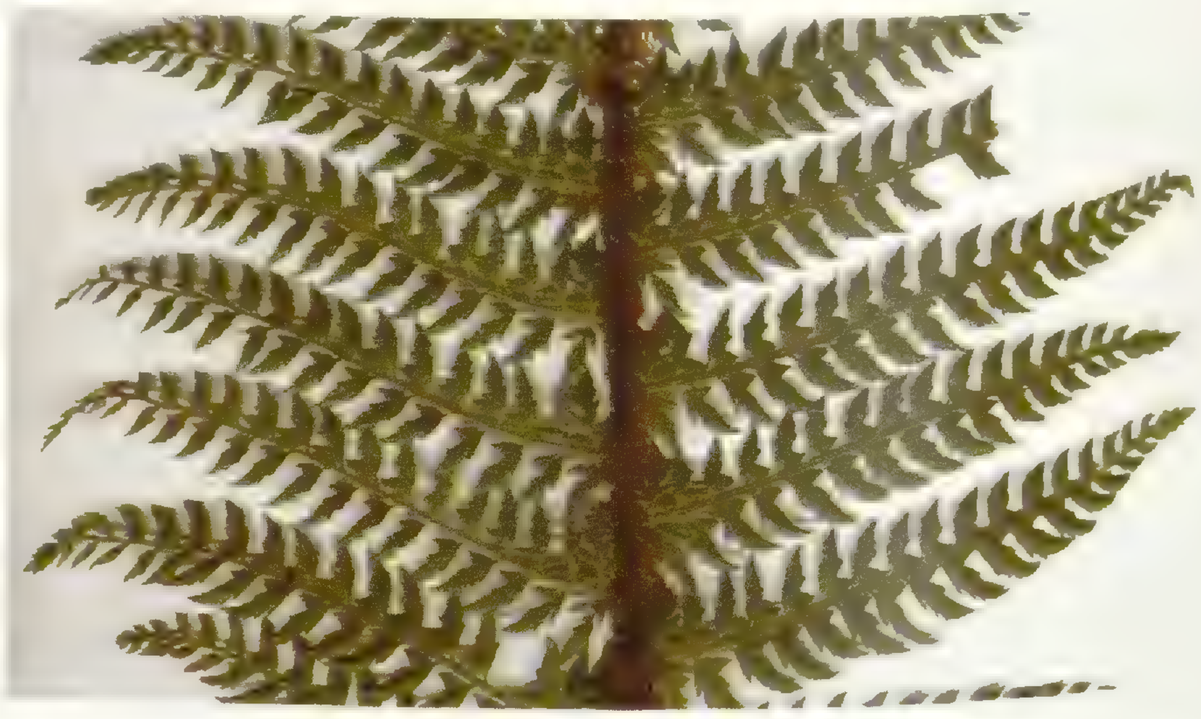

Fig. 7. Also collected in a Lakeland garden (and since lost!), this beautiful acutilobe has finer and longer pinnules than the Wiper example, with finely pointed serrations along the pinnule.

THE FINE FERNS of *FLORA GRÆCA*

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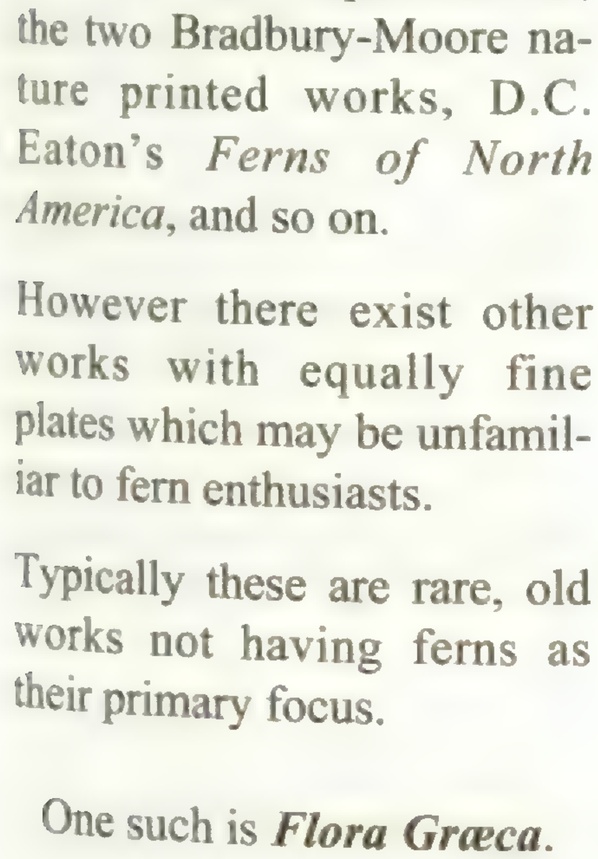
FERNS ARE ORNATE, decorative architectural plants lending themselves admirably to representation on the printed page, and a number of fern books with fine plates spring to mind: William Jackson Hooker's various coloured plate books, the two Bradbury-Moore nature printed works, D.C. Eaton's *Ferns of North America*, and so on.

However there exist other works with equally fine plates which may be unfamiliar to fern enthusiasts.

Typically these are rare, old works not having ferns as their primary focus.

One such is ***Flora Græca***.



FLORA GRÆCA:

SIVE

PLANTARUM RARIORUM HISTORIA

QUAS

IN PROVINCIIS AUT INSULIS GRÆCIÆ

LEGIT, INVESTIGAVIT, ET DEPINXIT CURAVIT

JOHANNES SIBTHORP, M.D.

CHARACTERES GMELINI

DESCRIPTIONES ET SYNONYMA

ILLUSTRAVIT

JOHANNES LINDLEY, PH. D.

VOL. X

LONDINI:

TYPIS RICHARD AND JOHANNIS E. TAYLOR.

MDCCCXL.

Fig.1. The Title Page (left) and colourful Frontispiece of volume 10 – note *Cosentinia vellea* at 8 o'clock on the garland. Bodleian Library, University of Oxford – shelfmark Sherard 761.

FERN ICONOGRAPHY

The production of this work was a massive project involving successive groups of people over a time span of over 50 years. It was conceived by John Sibthorp (1758-1796), initially a medical man who became more interested in botany, and succeeded his father's chair as the Sherardian Professor of Botany at Oxford in 1784. To honour his obligations under a travelling fellowship, he undertook his first major overseas trip during the years 1784-1787. For some of this time, he travelled with his friend John Hawkins (1761-1841), who was born in Cornwall and was the owner of the Trewithen House estate (now one of the famed Cornish gardens open to the public). Both men were members of the landed gentry and had a number of interests which they followed during their travels, but Sibthorp's focus was botany which he pursued avidly by collecting specimens and having them drawn by another travelling companion, the esteemed botanical artist Ferdinand Bauer (1760-1826) whom he had met and employed as his illustrator in Vienna in 1786. Sibthorp made plant notes in his diaries in the field, but was less diligent in relating these to either Bauer's field sketches or the collected specimens. This was to cause considerable difficulties when it came to the later production of the book.

A second series of overseas travels was undertaken by Hawkins (during 1793-1798) and Sibthorp (during 1794-1795). Again, they met up for a small part of their tours, but Bauer did not go on this trip, prevented to a large extent by Sibthorp's unsympathetic attitude to his employee - whilst admiring Bauer's artistic talents, Sibthorp adopted a somewhat harsh "master-servant" regime to their social and business relationships.

Their respective tours included many routes and countries, but all were broadly through northern and central Europe to the eastern Mediterranean, the main focus of their studies. *Flora Græca* covers plants specifically from the countries now known as Cyprus, Greece, western Turkey and southern Italy, and only includes plants collected/recorded/sketched during the first trip. The plants to be painted for *Flora Græca* by Bauer were dictated by Sibthorp (although it is difficult to see the scheme that guided his choices).

Fig. 2. ***Cosentinia vellea.*** The original drawing for plate 965 Acrostichum velleum. Bodleian Library, University of Oxford.

Sibthorp, who had endured ill health for much of his life, died in 1796 in Bath at the young age of 37. During his lifetime, although an enthusiastic botanist, he had managed to publish only one work, *Flora Oxoniensis* in 1794. In addition, he produced some of the manuscript of the *Prodromus* (the text only forerunner to the *Flora Græca*). However, in his will he made provision for the completion of the *Prodromus* and the production of *Flora Græca*, which was to consist of 10 volumes, each containing 100 plant portraits with descriptions. As executors charged with the implementation of this enormous undertaking he appointed Hawkins and a solicitor Thomas Platt (there was a third executor, Francis Wenman but he died soon after Sibthorp in 1796). One of their first tasks was to find an editor and author, and they appointed James Edward Smith (1759-1828), a famed botanist whose achievements included the authorship of the 36 volumes of Sowerby's English Botany (1790-1814), and the co-founding of the Linnean Society (having at Joseph Banks' suggestion purchased Linnaeus' library and collections). Smith in turn needed an engraver and colourer, and logically turned to his previous associate James Sowerby (1757-1822), he and his family and helpers being significant natural history artists, engravers and authors of the period.

All of the plant portraits were executed by Ferdinand Bauer, taken from sketches made in the field during the first overseas tour, and completed as watercolours following his arrival with Sibthorp in Oxford in 1787 at the end of the first tour. As well as being a highly

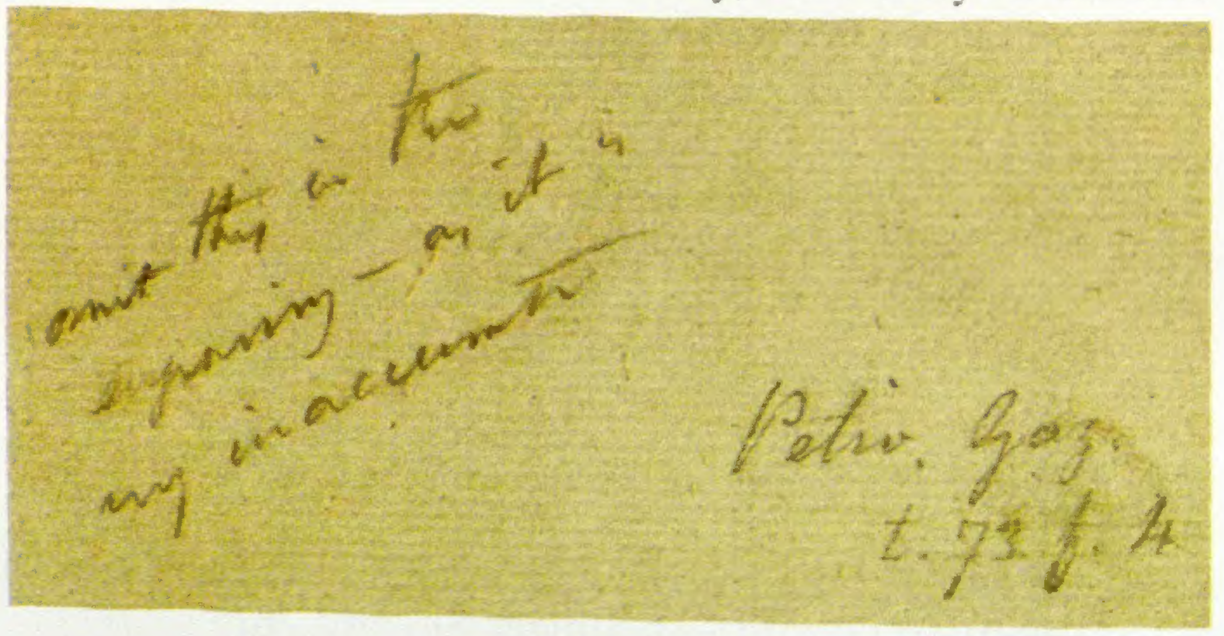
Fig. 3. ***Notholaena marantae.*** Plate 964 Acrostichum Marantae - the most spectacular of the three fern plates. Bodleian Library, University of Oxford – shelfmark Sherard 761.

accomplished artist, Bauer also displayed amazing productivity, achieving 966 watercolours in 53 months. However, towards the end he did become a little rushed, consequently some of the later botanical watercolour drawings were uncoloured or only partially so. Bauer added numbers to his field sketches which were used in conjunction with a colour chart to facilitate the later colouring of his watercolour drawings (see Lack & Ibanez, 1997 for a fuller account of this interesting technique and publication of the colour chart). Bauer also painted animals (but a *Fauna Græca* was never published) and, after leaving Oxford, some scenes from the trip.

During his life, Ferdinand Bauer took part in three major projects. The first was as illustrator for Norbert Boccius's *Liber Regni Vegetabilis* in Feldsberg (now Valtice in the Czech Republic) from about 1775 to 1785 with his two brothers Joseph and Franz. The second was the *Flora Græca* project. Towards the end of his *Flora Græca* involvement, he was approached by John Hawkins to undertake the engraving, but by that time he had become disillusioned with the work, and was tempted away by Joseph Banks (1744-1820) to start the third major phase of his productive life as illustrator of the plants of Australia over the years 1801-1817, commencing with his participation in Matthew Flinders' circumnavigation of Australia in the *Investigator* (1801-1803).

Smith started work on the book in 1799 aged 40, and continued until his death in 1828. He experienced considerable difficulty in analysing and ordering the various materials into a usable form, hindered largely by Sibthorp's lack of adequate documentation. However, he achieved the publication of the *Prodromus*, and the first 6 volumes of *Flora Græca* plus part of volume 7. The *Prodromus* covered 2800 species, whilst only 966 were covered in the completed *Flora Græca* (thus being slightly short of the 1000 stipulated in Sibthorp's will). However, the plant descriptions in *Flora Græca* are more detailed than those in the *Prodromus*.

Fig. 4. *Cheilanthes acrostica.* The original drawing for plate 966 Cheilanthes suaveolens – note the three images below the plant (upper and lower ultimate segments plus a sorus) and the faint m/s notes (lost in picture improvement - see below & text). Bodleian Library, University of Oxford.



On Smith's death, two other eminent botanists of their time were appointed to see the work to completion. Robert Brown's (1773-1858) contribution was only brief as he is thought to have lacked the motivation for the task. However, John Lindley (1799-1865) successfully completed volumes 7 to 10, the issue of the latter in 1840 signalling the end of the project.

The enormous cost of the project forced Sibthorp's executors to seek subscribers, but their contributions only covered about a quarter of the costs, the balance of the funds coming from Sibthorp's estate. In the end, only 25 copies of *Flora Græca* were produced, along with 500 copies of the *Prodromus*. However, publisher Henry Bohn produced between 1845 and 1856 a *Flora Græca* reprint of about 40 copies, being very similar to the first printing and quite difficult to tell apart, but "slightly inferior in colouring to the original and recognisable by the watermark '1845' on many plates" (Sitwell & Blunt, 1990). The Royal Horticultural Society's Lindley Library possesses both printings and the only difference revealed by a comparison of the three fern

plates was a lack of colouring on the stipe and rachis hairs of *Notholaena marantae* in the second printing – both the original watercolour and the first printing plate show these hairs correctly coloured brown.

Out of the 966 plates, only the last three (964-966 in volume 10) feature ferns, the plates of which display a startling beauty, clarity and vibrancy. Illustrated here is plate 964, Acrostichum Marantae (= *Notholaena marantae*) in the hope that this reproduction demonstrates at least some of the magnificence of the original plate (see Appendix 2 for a note on the printings). The other two ferns are illustrated here by reproductions of the original Bauer watercolours - Acrostichum velleum (= *Cosentinia vellea*) resulted in plate 965, and Cheilanthes suaveolens (= *Cheilanthes acrostica*) in plate 966. Being included in the last volume of *Flora Græca*, the fern descriptions were prepared by John Lindley (all the *Flora Græca* text is in Latin).

One striking and beautiful feature of *Flora Græca* is the inclusion of a colourful ornate frontispiece in each volume, with an upper floral garland (the plant species depicted anticipating the contents of that particular volume), and a lower scene. The frontispiece for Volume 10 is reproduced here. Note *Cosentinia vellea* at 8 o'clock on the garland. The scene is of the Delphi ruins (about 180 kms. north-west of Athens) and is thought to have been drawn by William Westall (1781-1850), the first seven frontispieces having been drawn by Bauer.

The three *Flora Græca* ferns are xerophytic species and are widespread in southern Europe (including the regions covered by *Flora Græca*) and Macaronesia, and are well known to BPS members familiar with these regions. They are all good likenesses of their species, and the portraits could serve well as identification aids. The *Cosentinia* and *Notholaena* images (Figs 2 & 3). successfully catch the "jizz" of the ferns, which are distinctive and unlikely to be confused with any other species.

However the identification of the fern depicted in plate 966 is more problematical, not because it is not a good portrait, but more because the taxonomy of European *Cheilanthes* has experienced recent changes resulting partly from the similarities between some of the species (and hybrids of course), and partly due to confusion over application of various Latin names, which together have contributed to an incomplete knowledge of their distribution. The name *Cheilanthes suaveolens* for plate 966 is an earlier synonym of *C. maderensis*. Both this and the rather similar *C. acrostica* are described in Flora Europaea (see Jermy & Paul, 1993). As hinted above, the taxonomic audit trails of these two species is somewhat complicated, and will not be elaborated here – suffice it to say that, in the opinion of Alison Paul (pers. comm.), the species represented on plate 966 is probably *C. acrostica*. This is supported further by the rather insignificant drawings of the upper and lower views of an ultimate segment (as well as a sorus), shown as being somewhat elongate as they are in *C. acrostica*, but not in *C. maderensis*. Possibly in James Smith's handwriting very faintly written is "omit this in the engraving – as it is very inaccurate". The Flora Graeca materials at Oxford include two *Cheilanthes* herbarium sheets, one having several *Cheilanthes* specimens. The plants on these sheets have been identified by Alison Paul as a mixture of both *C. maderensis* and *C. acrostica*. Perhaps therefore Bauer based his drawing on one of the *C. acrostica* specimens, whilst Smith, in reviewing the drawing, was looking at a *C. maderensis* specimen, hence his manuscript comment. These detailed images were indeed omitted from the published engraving.

Both Smith and Lindley were using Linnaeus' "Sexual System" of classification, which required Bauer to produce detailed floral dissection drawings for the flowering plants. But Linnaeus did not understand the reproductive mechanisms of plants without flowers (he called them all Cryptogamia). Indeed, the propagation of ferns from spores was not described until 1794 (Gibby, 1991), when Bauer was producing his drawings between 1787 and 1794. This perhaps explains the lack of any drawings showing fern morphology details in plates 964 and 965, and the rather half hearted attempt confined to the original drawing for plate 966.

The featuring of only three ferns in *Flora Græca* is a little puzzling. Admittedly being within the Mediterranean climate, the regions covered can not be considered particularly "ferny" in relation to say wetter sub-tropical and tropical areas, but they do contain considerably in excess of three species! There is a heavy bias towards flowering plants in *Flora Græca*, the breakdown of species coverage being – Pteridophytes 3, Gymnosperms 2, Dicotyledons 847, Monocotyledons 114. The mystery deepens because far more ferns are treated in the Prodromus where 2 lycophytes and 31 ferns are described (albeit so briefly as to constitute little more than a list). Thus Sibthorp probably paid as much attention to ferns as to other plants in his travels, but in his instructions to Bauer as to which species to paint, chose for whatever reason to give the ferns short shrift. Nevertheless, the three plates that were produced surely represent some of the finest fern images ever published.

Appendix 1

Flora Græca Fern Materials

The Plant Sciences Department at Oxford University holds most of the *Flora Græca* materials, including the Sibthorp herbarium collection, and the original Bauer field sketches. There are well over one hundred of the latter, documented in Lack with Mabberley, 1999, Appendix 1. In order to determine whether any of the three fern watercolours had been preceded by field sketches, I have scanned all of these – typically each sheet contains many faintly sketched plants, annotated with the colour number codes (see above). I did not detect any ferns on

these sheets, which could mean either: a) ferns were not sketched in the field and the watercolours were taken from the herbarium sheets and/or cultivated specimens; or b) ferns were depicted on some sketches which are thought to have been lost; or c) I missed them! Currently there is an exercise underway in Oxford to reconcile the drawings with the watercolours and published plates.

The Sibthorp herbarium includes 42 sheets of ferns. There are two *Cheilanthes* sheets as discussed above. There are also 4 sheets of *Notholaena marantae*, and 2 sheets of *Cosentinia vellea*. An exercise has been undertaken to check the identification of all the ferns on the herbarium sheets in relation to the fern list in the *Prodromus*.

Appendix 2

A Note on the Illustration Printings

The illustrations reproduced here are taken from John Hawkins' copy of *Flora Græca* and Ferdinand Bauer's watercolour drawings, being part of the *Flora Græca* materials cared for by the Plant Sciences Library at Oxford University.

The production of the *Flora Græca* plates required the original watercolours to be engraved onto copper plates, and this was obviously performed extremely diligently, presumably with the aid of some optical equipment. The fern plate images are almost identical to the original watercolours in all of the three species, hence we have not reproduced here full sets of both the watercolours and the finished plates. The plate engravings from 952 onwards are thought to have been crafted by a Mr Barclay, albeit their colouring remained with the Sowerby team. Note also that the two watercolours reproduced here were fully coloured, although on the original watercolour of *Notholaena marantae* (not reproduced here), only 4 out of the 8 fronds were in fact coloured.

The Bodleian Library's reproduction services supplied to me all three watercolours, and the four plates (including the frontispiece) as high resolution photographs of the originals. Although it may be impossible to reproduce these images in their full original glory, my hope is that we have achieved something as close to the originals as possible.

Appendix 3

Further Information

The following are recommended for those wishing to seek further information –

Lack with Mabberley, 1999, being a comprehensive brilliantly researched and scholarly history of the project, with much reference material, and focusing particularly on the travels of Sibthorp and Hawkins. Much of the information for this article was gleaned from this work. Sadly the book is very expensive (£250!). See Mathew, 1999 for a review.

Harris, 2007 for what promises to be a more approachable account of the *Flora Græca* story, together with illustrations of 200 of the plates.

Mabberley, 1999 for a beautifully illustrated account of the life of Ferdinand Bauer.

The Royal Horticultural Society's Lindley Library in London to view both *Flora Græca* printings. Visitors are normally allowed to consult books from the Rare Book Room without a previous appointment, but are expected to show some form of identification such as a Passport. For most people, a visit to this or another major library will be the only opportunity to see this work first hand. To quote from a talk given by Tony Swann of Wheldon & Wesley (Swann, 1997, page 17) "We sold a copy for £3,500 to an English university in 1962 and the book recently made $321,500 at auction."

The Oxford Digital Library is in the process of digitising the *Flora Græca* materials, but at the time of writing (February 2007), a public interface is not yet available.

For more up to date information please go to http://www.odl.ox.ac.uk

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